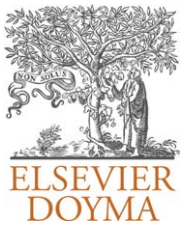
Apunts Med Esport. 2011;46(169):11—15



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ORIGINAL ARTICLE

Self selected walking speed in overweight adults: Is this intensity enough to promote health benefits?

Bruno Pereira de Moura, João Carlos B. Marins, Paulo Roberto S. Amorim*

Viçosa Federal University, Biological Sciences Centre, Physical Education Department, Viçosa, Brazil

Received 22 March 2010; accepted 5 October 2010

KEYWORDS
Exercise intensity;
Walking;
Self-selected speed;
Physical activity;
Overweight

Abstract
Introduction and objective: Walking is the most often indicated physical activity modality to increase population physical activity levels aiming to improve health-related conditions. However, we do not know how overweight adults self-selected the intensity of their walking speed. The objective was to evaluate the self-selected walking speed in overweight adults.
Methods: We evaluated 50 men (41.7 ± 5.4 years), who performed walking without professional guidance. The exercise intensity was monitored by heart rate, and also by the perceived exertion. We performed anthropometric measurements of body weight, height, waist circumference and hip. The sample was divided into two groups by body mass index (BMI) categories: G1 (BMI < 25 kg m^{-2}) = «Normal Weight» and G2 (BMI ≥ 25 kg m^{-2}) = «Overweight». Was used t test for independent samples, with $p < 0.05$.
Results: The t test showed significant difference between groups for the following variables: body weight, waist hip ratio (WRH) and waist circumference ($p \leq 0{,}001$). It was verified, by the heart rate analyses, an elevated percentage of participants who did their self-selected walking intensity choices at higher levelsthan the «moderate» classification, in both groups.
Conclusion: It can be concluded that the self-selected walking intensity was adequate for the largest part of the participants in attending American College of Sports Medicine recommendations, mainly in normal weight group. However large part of the evaluated sample in overweight group is exercising at inadequate intensity, considering their age and weight conditions. Particularly for this group, professional exercise guidance has to be recommended for safety reasons.

* Corresponding author.
E-mail address: pramorim@ufv.br (P.R.S. Amorim).

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doi:10.1016/j.apunts.2010.10.004

PALABRAS CLAVE
Intensidad de ejercicio;
Paseo;
Velocidad autoseleccionada;
Actividad física;
Sobrepeso

Velocidad de caminata autoseleccionada en adultos con sobrepeso: ¿es suficiente esta intensidad para promover los beneficios de la salud?

Resumen
Introducción y objetivo: Caminar es, a menudo, la modalidad de actividad física recomendada para incrementar los niveles de actividad enfocados a mejorar el estado de salud. De todas formas, ignoramos cómo los adultos con sobrepeso seleccionan la intensidad de su caminata rápida. El objetivo se centra en evaluar esta velocidad.
Métodos: Evaluamos 50 hombres (41,7 ± 5,4 años) que realizaban caminatas sin asistencia profesional. La intensidad del ejercicio era monitorizada por las pulsaciones y también por el esfuerzo percibido. Se realizaron mediciones antropométricas de peso, altura, contorno de cintura y de cadera. La muestra se dividió en dos grupos por categorías de índice de masa corporal (IMC): G1 (IMC < 25 kg m^{-2}) = «Peso normal» y G2 (IMC ≥25 kg m^{-2}) = «Sobrepeso». Se empleó el test t para muestras independientes, con $p < 0,05$.
Resultados: El test t mostró diferencias significativas entre grupos en las siguientes variables: peso corporal, cintura/cadera y contorno de cintura ($p \leq 0,001$). Se verificó con análisis de pulsaciones que un elevado porcentaje de participantes seleccionaron su propia velocidad al caminar a niveles más altos que la clasificación de «moderado», en ambos grupos.
Conclusión: Se puede concluir que la intensidad autoseleccionada de caminar era adecuada para un amplio número de participantes que siguieron las recomendaciones del American College of Sports Medicine, principalmente en el grupo de peso normal. No obstante, una parte importante del grupo con sobrepeso realiza ejercicio con una intensidad inadecuada, teniendo en cuenta su edad y su peso. Particularmente para este grupo, es recomendable una guía de ejercicio por razones de seguridad.

Introduction

Overweight is becoming a public health problem in Brazil. Currently 43.3% of the population is overweight; this percentage is higher between men (47.3%) than between women (39.5%). In both sexes, the frequency of this condition tends to increase with age, declining only after 65 years. The increase is particularly noticeable among the age groups of 18-24 and 35-44 years, when the frequency of overweight increases twice between women and two and half times among men.[1]

Increases in population physical activity levels are priorities in many public health policies recommendations.[2] To promote an increase in physical activities levels, and to assure a better quality of life, adults aged between 18 and 65 must maintain a physically active lifestyle,[3] performing aerobic exercises of moderate intensity for at least 30 minutes, five days a week, or vigorous intensity exercise for at least 20 minutes three days a week.[4] The combination of moderate and vigorous intensities activities is also recommended.

The benefits of aerobic exercises to health are well reported in literature.[2,5-10] However, most of these benefits are linked to the physical activity intensity, and with higher intensities comes greater benefits.[7]

Contemporary epidemiologic messages stimulate an active lifestyle.[11] When people assimilate this message and start their physical activity, as a walking practice, they do not have an adequate control on intensity and habitually use a self-selected walking speed, based only on self comfort.

The self-selected walking speed in obese individuals was studied by Hills et al,[12] which verifies that theirs self-selected intensities were enough to improve the cardiorespiratory fitness. Physical activity pattern of overweight men was described by Arilla et al.[13] However, we cannot find studies describing the adequacy of this speed intensity in overweight adults.

It is necessary to know the induced cardiovascular stimulus when doing an aerobic activity for all people, mainly on overweight individuals, to reinforce the public health recommendations, and answering a question coming from the practice in the real world: Are the overweight individuals walking at self-selected speed achieving the public health intensities recommendations to promote health benefits?

The aim of this study was to verify the adequacy of the self-selected walking speed as exercise intensity for overweight, and to compare this exercise intensity with normal weight adults.

Methods

This study was approved by the ethics committee of the Viçosa Federal University (UFV) (n.45/2007 protocol) and respects the laws for research on human's beings according to Helsinki declaration.

Subjects

Fifty male volunteers aged between 30 and 50 years (mean age: 41.7 ± 5.4) were randomly selected to participate in this study. The criteria for inclusion were the age interval and perform regular aerobic exercise on the university campus for at least 2 months and not have professional guidance.

Protocol

The experimental procedure was divided into three phases:

- *Phase 1 — Sample Selection.* For two weeks registrations were carried out from men who had a walking practice on the campus of UFV, having a total of 300 people. We pre-selected those who were aged between 30 and 50 years (n = 100). Practitioners that fit the inclusion criteria were selected after a telephone contact and all who voluntarily agreed to participate in this study comprised a sample of 50 male individuals. The sample was divided into two groups classified by the body mass index (BMI): G1 (BMI < 25 kg m^{-2}) = «Normal Weight» (NW) with 18 participants and G2 (BMI ≥25 kg m^{-2}) = «Overweight» (OW) with 32 participants.
- *Phase 2 — Anthropometry.* Held at the Human Performance Laboratory of the Physical Education Department of UFV, where the body weight (kg), height (cm), waist and hip circumference (cm), were measured.

  Cutoff limits for BMI and waist circumference (WC) were recommended by World Health Organization[14] and waist and hip ratio (WHR) were suggested by Bray and Gray.[15]

  Procedures for anthropometric data collection followed the methodological guidelines of Lohman et al.[16]

  Then it was explained to the participants how to interpret the perceived exertion (RPE)[17] and the weekly frequency of training and length of walking practice was evaluated.

  Finally, the resting heart rate (RHR) was measured. Participants were required to lay-down for a period of five minutes, being considered in the analysis the lower value in this interval.
- *Phase 3 — Physical activity monitoring.* The intensity control was performed by monitoring the heart rate (HR) with its monitor Polar®-model S610 and the RPE interpretation. Individuals performed their regular walking activity, without any interference from the researcher, who accompanying them on a bike during a whole walking session for each participant. The researcher was always behind each subject to avoid influence on their usual selected pace. Despite the distance demarcation in all Campus paths, it was performed a double check with a calibrated odometer attached to the bike.

Maximum heart rate (MHR) determination was performed using the equation MHR = 211 - 0.8 X age,[18] and the intensity of physical activity was obtained through the equation of the heart rate training (HRT) = HR_{rest} Intensity + % × (MHR − HR_{rest}).[19]

For calculating the HRT it was used the average HR obtained during walking exercise, discharging the three initial and final minutes of exercise. The walking intensity classification was in accordance with the American College of Sports Medicine (ACSM).[20]

Statistical analysis

Data were organized with Polar Precision Performance™ SW 3 software and Microsoft® Office Excel 2007. Statistical analysis consisted of descriptive analysis, percentage of distribution and t test for independent samples, adopting a level of significance p < 0.05. Data were presented as a mean value and standard deviations (SD). Statistical analyses were carried out with SigmaPlot for Windows (Version 11.0, 2008, Germany).

Table 1 Sample age and anthropometric characteristics by groups (Mean ± SD).

Variable	Normal Weight — G1 (n = 18)	Overweight — G2 (*n* = 32)
Age (years)	40.4 ± 5.4	42.3 ± 5.3
Weight (Kg)	70.2 ± 8.0	80.3 ± 7.1*
Height (cm)	174.3 ± 0.08	172.6 ± 0.05
BMI (kg·m^{-2})	23.07 ± 1.6	26.9 ± 1.9*
WHR	0.87 ± 0.04	0.93 ± 0.04*
WC (cm)	85.6 ± 6.06	96.4 ± 5.8*

* Statistically significant difference between the groups for Test t ($p \leq 0{,}001$).

Results

The t test showed significant difference between groups with the following variables: body weight, Body Mass Index (BMI), Heart Rate (HR) and Waist Circumference (WC) (Table 1).

Physiological variables, such as resting heart rate (RHR), maximum heart rate calculated (MHRC), heart rate average (HRA), maximum heart rate walking (MHRW), percentage heart rate reserve (% HRR) and rate perceived exertion (RPE) as well as exercise characteristics, such as duration, distance and speed, are displayed at Table 2.

By checking weekly walking practice G1 and G2 showed 4.3 ± 1.5 and 4.0 ± 1.2 days per week, respectively. Regarding the walking practice time, 94% of the G1 participants walked for more than six months and for G2 walking practice time was more than six months for 84% of the participants.

Sample distribution by groups for % HRR and RPE classification are showed in Figs. 1 and 2, respectively.

Table 2 Sample physiological and exercise variables by groups (Mean ± SD).

Variable	Normal Weight — G1 (n = 18)	Overweight — G2 (*n* = 32)
RHR (bpm)	66.4 ± 11.8	63.5 ± 7.1
MHRC (bpm)	178.6 ± 4.3	177.1 ± 4.3
HRA (bpm)	135.4 ± 23.7	132.1 ± 17.8
MHRW (bpm)	151.3 ± 23.9	152.2 ± 21.6
Duration (min)	42.8 ± 17.4	41.9 ± 14.7
Distance (Km)	6.3 ± 1.7	5.7 ± 2.0
Speed (Km/h)	8.2 ± 2.4	7.3 ± 2.1
RPE (BORG)	10.4 ± 2.1	10.6 ± 1.7
% HRR	61.8 ± 19.7	59.7 ± 15.5

RHR = resting heart rate; MHRC = maximum heart rate calculated; HRA = heart rate average; MHRW = maximum heart rate walking; RPE = rate perceived exertion; % HRR = percentage heart rate reserve.

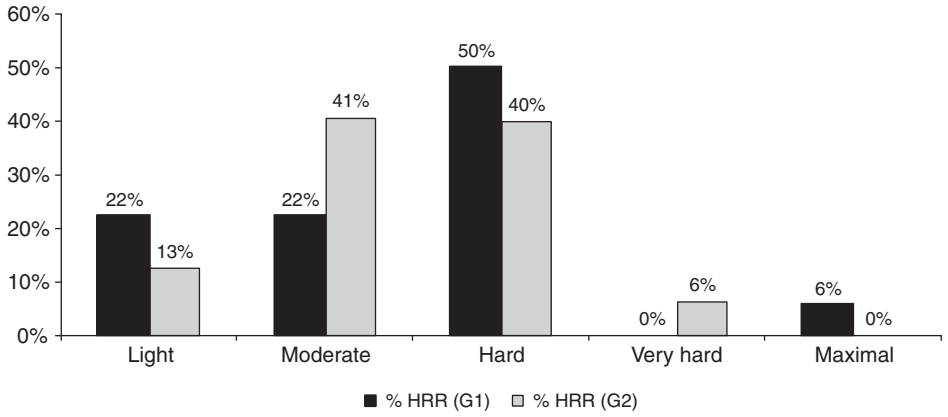

Figure 1 % HRR distribution: (G1) normal weight group and (G2) overweight group.

Discussion

The overweight incidence is growing up in the Brazilian population, with higher prevalence in men (47.3%) than in women (39.5%).[1] Our sample was representative of this prevalence, once after split group by BMI categories was verified 64% of overweight participants. Statistics differences verified are directly aligned with this condition, because variable as body weight, BMI, WHR and WC has a strong relationship with body fat.

Evaluation of self-selected walking speed with different techniques, HR and RPE, showed no agreement between them, once which by RPE intensity was classified as «light» and by HR was classified as «hard». Although there is no statistical difference between groups on the self-selected walking intensity, the data shows that both groups were unable to correctly interpret the RPE (Figs. 1 and 2). This can be explained by the transversal study characteristic, where the instruction time and practice with RPE was short. Our results are in agreement with DaSilva et al[21] findings that physiological responses relative to maximal capacity are influenced by adiposity during walking at self-selected pace, but not perceptual and affective responses.

Despite the former study limitation using RPE, was verified by HR analyses, an objective tool, both groups with an elevated percentage of participants who did theirs self-selected walking intensity choices at higher levels than the «moderate» classification. Both groups were in agreement with ACSM[4] recommendations regarding intensity, as well as weekly frequency and continuity, once they have a sustained walking practice of more than six months long. However, despite attending ACSM[4] recommendation large part of our sample is classified as overweight, this can be partially explained by inadequate food habits as well as because physical activity is only part of the energy balance equation, but we have no information about energy intake of this sample.

Recent study conducted by Sawashita et al[22] verifying the effects of light caloric restriction and high-intensity interval walking in older overweight Japanese, found that the combination between physical exercise and caloric restriction were able to avoid lifestyle related diseases and improve health status.

Individual analyses of self-selected walking speed in both groups shows higher percentage of participants (G1 = 50% and G2 = 40%) exercising in the «hard» intensity, and others in «very hard» or «maximal intensities». Data from the Copenhagen City Heart Study[7] indicated that walking relative intensity as more important than walking duration for all mortality causes. This is a serious observation because this sample is at an age and weight status of elevated risk to cardiovascular disease, in many cases asymptomatic, without professional guidance. Despite the use of self selected

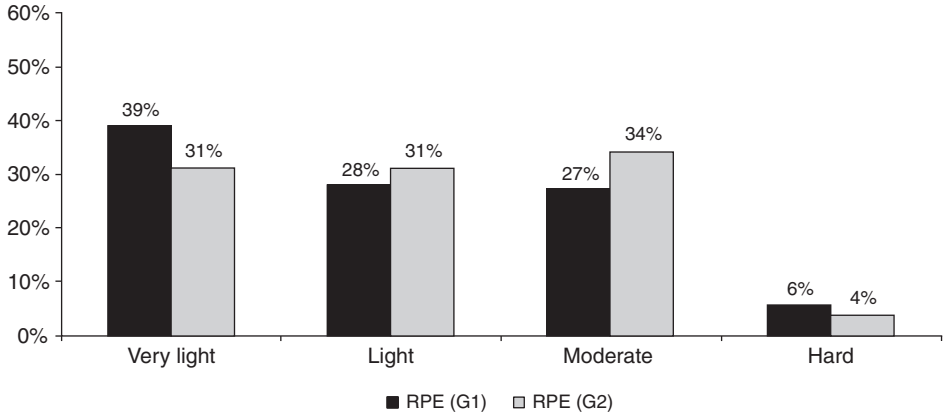

Figure 2 RPE distribution: (G1) normal weight group and (G2) overweight group.

intensity has been supported with sedentary individuals to promote positive affective responses[23] and may influence exercise adherence, physical activity prescription has to be done and supervised by a professional, because exercise-induced health benefits, has to have adequately controlled intensities.

Nemoto et al[8] shows that high-intensity interval walking may protect against age-associated increases in blood pressure and decreases in thigh muscle strength and peak aerobic capacity more than moderate intensity continuous walking training. However, we have to be conscious of the professional guidance needs to achieve exercise maximal benefits and to reduce participant risks in an inadequate exercise program.

Can be concluded that the self-selected walking intensity was adequate for the larger part of the participants in attending ACSM[4] recommendations, mainly in normal weight group. However, large part of the evaluated sample in overweight group is exercising in the «hard» intensity, an inadequate intensity for safety reasons, considering their age and weight conditions related to the increased cardiovascular risk of this population. Particularly for this group the «moderate» intensity, as recommended by the ACSM, is the best intensity to achieve health benefits as well as is the safety intensity to avoid undesirable health problems, mainly for starters.

Conflict of interests

Authors declare that they don't have any conflict of interests.

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