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ADULT CARDIOLOGY-ORIGINAL ARTICLE

Effect of dancing and nutrition education on hemodynamic and autonomic status in adults with metabolic syndrome: a randomized controlled clinical trial

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Cardiovascular system;
Hemodynamics;
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Abstract
Background: Although the benefits of exercise and changes in lifestyle on components of the metabolic syndrome (MS) have been described, little is known about the effect of dancing and nutritional changes on the cardiovascular system.
Objective: Evaluate the effect of an intervention based on dancing and nutrition education on hemodynamic and autonomic status in adults with MS.
Methods: A randomized controlled clinical trial was conducted involving 59 adults with MS. The intervention lasted 12 weeks and consisted of an aerobic exercise program (dancing) at an intensity of 60-75% of heart rate reserve, 60 minutes 3 times a week, and muscle strength training at an intensity of 50% of a maximum repetition, 30 minutes twice a week. The nutrition education program consisted of 2-hour workshops each week. Assessment of impedance cardiography and function of nervous system with analysis of heart rate variability (HRV) were made before and after the intervention.
Results: In the intervention group, a decrease in mean arterial pressure of -7.8 mmHg (95% CI, -12.84 to -2.75; $P = 0.004$) was found as well as in the systemic vascular resistance (SVR) index of -864.29 dyn·s·m^2/cm^5 (95% CI, -1506.31 to -222.26; $P = 0.010$). Increase was observed in

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the cardiac output index of 0.48 L/min/m^2 (95% CI, 0.14 to 0.83; $P = 0.007$). In the spectral analysis of HRV a reduction in LF/HF ratio of -0.52 (95% CI, -1.02 to -0.02; $P = 0.040$) was also found.

Conclusions: An intervention with dancing and nutrition education lowers arterial blood pressure and SVR and has favorable effects on the sympathovagal balance in patients with MS.

PALABRAS CLAVE
Sistema cardiovascular;
Hemodinamia;
Sistema nervioso autónomo;
Ejercicio;
Nutrición

Efecto del baile y la educación nutricional sobre el estado hemodinámico y autonómico en adultos con síndrome metabólico: un ensayo clínico controlado aleatorio

Resumen

Antecedentes: Aunque se describieron los beneficios del ejercicio y cambios en el estilo de vida sobre los componentes del síndrome metabólico (SM), poco se sabe del efecto del baile y la nutrición en el sistema cardiovascular.

Objetivo: Evaluar el efecto de una intervención de baile y educación nutricional sobre el estado hemodinámico y autonómico en adultos con SM.

Materiales y métodos: Ensayo clínico controlado que incluyó 59 adultos con SM. La intervención duró 12 semanas y consistió en un programa de baile a una intensidad del 60 a 75% de la frecuencia cardiaca de reserva, 60 minutos, 3 veces a la semana, y entrenamiento de la fuerza a una intensidad del 50%, 30 minutos dos veces a la semana. El programa nutricional consistió en talleres de 2 horas cada semana. La cardiografía de impedancia y el análisis de la variabilidad de la frecuencia cardiaca (VFC) fueron realizados antes y después de la intervención.

Resultados: El grupo de intervención disminuyó la presión arterial media en -7,8 mmHg (IC 95%, -12,84 a -2,75; p = 0,004) y el índice de resistencia vascular sistémica (RVS) en -864,29 dyn·s·m^2/cm^5 (IC 95%, -1506,31 a -222,26; p = 0,010); y aumentó, el índice de gasto cardiaco en 0,48 L/min/m^2 (IC 95%, 0,14 a 0,83; p = 0,007). En la VFC se reportó una reducción en la relación LF/HF de -0,52 (IC 95%, -1,02 a -0,02; p = 0,040).

Conclusiones: Una intervención de baile y educación nutricional disminuye la presión arterial y la RVS y tiene efectos favorables en el balance simpático-vagal en pacientes con SM.

Introduction

Metabolic syndrome (MS) is a clinical condition with a high prevalence,[1] mainly due to changes in the Western lifestyle, which predispose to an increased risk of coronary events.[2] Early recognition and proper diagnosis of people with MS are clinically relevant because patients require aggressive strategies of pharmacological and non-pharmacological treatment.[2] MS is associated with insulin resistance and abdominal obesity and includes a series of alterations in vascular and metabolic function.[3]

Insulin resistance observed in patients with MS leads to an increase in insulin secretion (hyperinsulinemia), which has deleterious effects on the cardiovascular system.[4] Although insulin has a vasodilatory effect,[5] when endothelial dysfunction is present, activation of the sympathetic autonomic nervous system (ANS) is predominant, as are its corresponding hemodynamic consequences, such as increased heart rate, myocardial contractility, stroke volume, cardiac output, systemic vascular resistance (SVR), and arterial blood pressure.[6,7] An increase in sympathetic tone increases the risk of cardiovascular death, and at the same time is related to metabolic disorders such as obesity, insulin resistance, type 2 DM, and MS.[6]

Exercise training and a healthy diet have favorable effects on different cardiovascular risk factors such as arterial hypertension, dyslipidemia, DM, and obesity.[8] Exercise and good eating habits change body composition,[8] increase insulin sensitivity[8] and baroreflex sensitivity,[9] improve endothelial function,[10] hemorheology, hemostasis and sympathovagal balance,[10,11] reduce inflammation,[10] and slow the progression of atherosclerotic lesions.[8] However, despite the current evidence on the beneficial effects of exercise and diet, adherence to intervention programs is low.[12]

Dancing is a type of exercise that can be adapted culturally in each region in order to increase adherence which has been associated with a lower risk of MS in middle-aged and older people.[13] Dancing has also been used as treatment and rehabilitation of patients with different risk factors and

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