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Effects of exercise and weight loss on depressive symptoms among men and women with hypertension

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Abstract

Objective: This study aimed to investigate changes in depressive symptoms in hypertensive individuals participating in an exercise and weight loss intervention. **Methods:** This study involved 133 sedentary men and women with high blood pressure (BP; 130–180 mmHg systolic BP and/or 85–110 mmHg diastolic BP) who participated in a 6-month intervention consisting of three groups: aerobic exercise, aerobic exercise and weight loss, and a waiting list control. **Results:** Participants in both treatment groups demonstrated significant improvements in aerobic capacity and lower BP compared with participants in the control group. Participants in the active treatment groups who had mild to moderate depressive symptoms at baseline also exhibited greater reductions in depressive symptoms compared with participants in the control group. **Conclusion:** Results from the present study suggest that exercise, alone or combined with weight management, may reduce self-reported depressive symptoms among patients with hypertension.

Keywords: Hypertension; Depression; Exercise; Weight loss; Aerobic fitness

Introduction

Depression is a major health burden worldwide and is relatively common among individuals with chronic health conditions [1–3]. Although there have been important advances in pharmacological treatment of depression [4], a significant number of patients do not respond to antidepressant medication [5]. Consequently, there has been considerable interest in the development of new and effective treatments for depression. A growing body of research indicates that exercise may be a safe and effective treatment for depression [6–8], comparable to psychotherapy [9,10] and pharmacological treatment [11,12]. The majority of previous studies have found exercise to be effective in reducing depressive symptoms among both healthy populations [7,13–17] and patients with heart disease [18–26]. However, it also has been noted that many studies have been plagued by methodological weaknesses, such as small samples, improper statistical analyses, and a lack of a control group, leaving uncertainty about the value of exercise as a treatment of depression [8].

The present study examines the effects of exercise on depressive symptoms among individuals with elevated blood pressure (BP). Several previous studies have shown that depression and hypertension may often exist comorbidly [27,28] and that depression may be a risk factor for the development of coronary heart disease (CHD) [29,30]. Given the increased risk of CHD among individuals with depression, interventions that reduce depressive symptoms among patients with hypertension may be especially important given the increased risk of CHD in this population. Furthermore, depressive symptoms have been

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associated with a greater risk for hypertension-related morbidity, cerebrovascular events, and mortality in hypertensive individuals, even at subclinical levels [31,32].

Methods

Participants

This study represents a secondary analysis of a previously reported clinical trial examining the effects of exercise and weight loss in a sample of patients with high BP [33]. Briefly, participants had unmedicated high normal BP or Stage 1 to 2 hypertension and were sedentary, overweight, or obese and were at least 29 years old. Exclusion criteria included current antidepressant use, current substance abuse, medical contraindications to exercise, a major psychiatric disorder requiring treatment, and ongoing participation in regular aerobic exercise. Participants were recruited from advertisements placed in local newspapers, television, and radio stations. Additionally, referrals from local clinics and BP screenings at community health fairs and local shopping centers contributed to participant recruitment.

As reported previously, 2399 individuals were initially screened through a preliminary telephone conversation and 320 individuals underwent a subsequent medical evaluation (Fig. 1). One hundred thirty-three individuals met the study criteria and were randomized following a 2:2:1 schema to one of three groups for the 6-month treatment program: aerobic exercise (EX; n=54), weight management including aerobic exercise (WM; n=55), and waiting list control (WLC; n=24). All participants who consented to participate in the trial were eligible for assignment to any one of the three treatment groups.

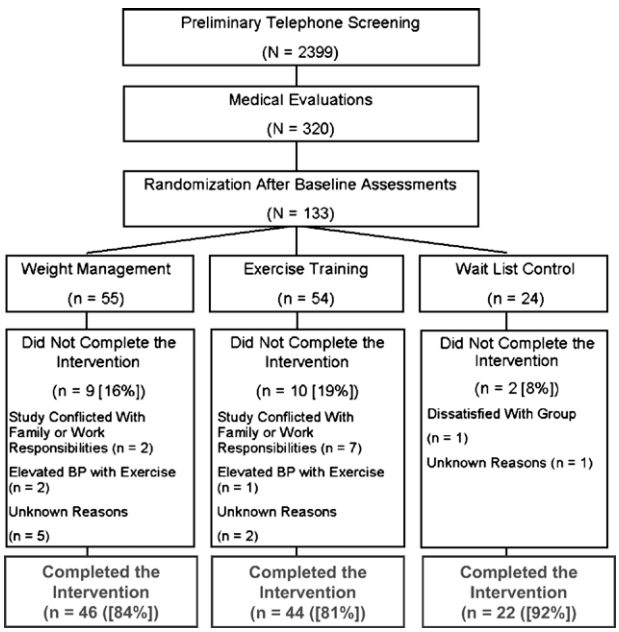

Fig. 1. Flow chart of trial.

Interventions

EX participants exercised three to four times per week at a level of 70% to 85% of their initial heart rate (HR) reserve [34] determined at the time of their baseline treadmill test. The exercise program consisted of 10 min of warm-up exercises, 35 min of cycle ergometry and walking (and eventually jogging), and 10 min of cool-down exercises. Participants were asked to maintain their pretreatment diets.

WM participants exercised three to four times per week using the identical protocol as previously described. In addition, participants took part in a weight management program in small groups of three to four members based on the LEARN manual [35]. The primary goal of the intervention was a weight loss of 0.5 to 1.0 kg/week, achieved gradually by decreasing caloric consumption and fat intake through lifestyle changes.

The group format consisted of 26 weekly group sessions. Weight was recorded at each session, and participants' food diaries and behavioral modification targets were reviewed. Group participation was encouraged during this process in supporting fellow group members and in problem solving around obstacles and lapses that they may have encountered. During the last 6 weeks of the program, sessions focused increasingly on weight maintenance, and group members worked on individualized plans for maintaining the changes they had made during the past 6 months.

Participants in both the EX and WM groups were instructed on how to monitor their radial pulses and maintain their HRs at or above their target level for at least 30 min. A trained exercise physiologist supervised all exercise sessions and performed two to three random checks of HRs per session to ensure that participants were exercising at a sufficient intensity.

WLC participants were asked to maintain their usual dietary and exercise habits for 6 months until they were reexamined. On completion of their posttreatment assessment, participants were then allowed to select either of the two active treatments and could participate under supervision for 6 months.

Depression measures

In order to investigate the effects of the intervention in alleviating depressive symptoms, participants completed the Beck Depression Inventory (BDI) [36] at baseline and after 6 months. The BDI is a standardized 21-item self-report questionnaire consisting of symptoms and attitudes related to depression, including items such as self-dislike, suicidal ideation, insomnia, and sadness. The items are summed with total scores ranging from 0 to 63, with higher scores indicating higher levels of depression. The BDI has been shown to be a valid and reliable measure of depression