Effects of short-term exercise training on signs and symptoms of generalized anxiety disorder

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Abstract

Background: No randomized controlled trial has investigated exercise training effects on signs and symptoms that characterize patients with Generalized Anxiety Disorder (GAD).

Objectives: To quantify and compare the effects of six weeks of resistance (RET) and aerobic exercise training (AET) on signs and symptoms associated with GAD.

Methods: Thirty sedentary women, aged 18–37 years, diagnosed by blinded clinicians with a primary DSM-IV diagnosis of GAD, who were not engaged in treatment other than pharmacotherapy, were randomized to six weeks of RET, AET, or wait list (WL). RET involved two weekly sessions of lower-body weightlifting. AET involved two weekly sessions of leg cycling matched with RET on body region, positive work, exercise time, and load progression. Outcomes included concentration difficulty, trait anxiety, symptoms of depression, tension, low vigor, fatigue and confusion, irritability, muscle tension, and pain location and intensity. Hedges’ d effect sizes and 95% confidence intervals were calculated at weeks two, four, and six for each exercise condition compared to WL.

Results: RET significantly reduced feelings of anxiety-tension and the frequency and intensity of irritability. RET also resulted in six-week Hedges’ d effect sizes ≥0.36 for trait anxiety, concentration, symptoms of depression, fatigue and vigor, and pain intensity. AET resulted in comparable improvements in trait anxiety, concentration, irritability, muscle tension, and symptoms of fatigue and vigor. Effects for 9 of 12 outcomes were non-significantly larger for RET compared to AET.

Conclusions: Short-term RET and AET provoke comparable improvements in signs and symptoms associated with GAD, particularly irritability, anxiety, low vigor and pain. Findings warrant further investigation.

Clinical trial registration: (ClinicalTrials.gov) Identifier: NCT00953654.

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1. Introduction

Findings from a recent randomized controlled trial indicated that short-term exercise training may be an effective adjuvant or augmentation treatment with minimal risk of adverse events to ameliorate worry symptoms, the hallmark symptoms of Generalized Anxiety Disorder (Herring, Jacob, Suveg, Dishman, & O’Connor, in press). In addition to pathological worry, patients with Generalized Anxiety Disorder (GAD) also are often characterized by an elevation in one or more associated signs and symptoms, including restlessness and feelings of anxiety, fatigue, difficulty concentrating, irritability, muscle tension (American Psychiatric Association, 2000), pain (Beesdo, Jacobi, Hoyer, Low, & Hofler, 2010; Wittchen et al., 2002) and depression (Watson, 2009).

There has been limited success in treating the signs and symptoms associated with GAD. Although pharmacotherapy has shown some efficacy as a frequently employed first line treatment (Chessick, Allen, Thase, et al., 2006; Hackett, Haudiquet, & Salinas, 2003), there have been notable drawbacks including well-established negative side effects such as nausea and sexual dysfunction (Corona et al., 2009). Because GAD symptoms are heterogeneous, pharmacotherapy may well attenuate one symptom but exacerbate another. For example, selective serotonin reuptake inhibitors have shown efficacy for GAD symptom improvement (Chessick et al., 2006; Hackett et al., 2003), but they often exacerbate sleep disturbances (Schweitzer, 2005). Behavioral treatments also have demonstrated efficacy (Chambless et al., 1998), but there are logistical barriers associated with these treatments, including expense and the need for extensive specialized training among practitioners who provide...
therapy. Thus, there is a continued need to explore alternative or adjuvant treatments, including exercise training, for the associated signs and symptoms of GAD.

Exercise training has positive effects on multiple signs and symptoms that characterize patients with GAD, including poor concentration (Colcombe & Kramer, 2003), depression (Blumenthal et al., 1999), fatigue (Puetz, O’Connor, & Dishman, 2006), feelings of anxiety (Broocks et al., 1998), muscle tension (Smith, O’Connor, Crabbe, & Dishman, 2002), and pain (Busch, Schacter, Peloso, & Bombardier, 2002; Hayden, van Tulder, Malmivaara, & Koes, 2005). In addition, the relation between exercise and irritability is of potential interest in part because of associations between negative moods related to irritability, including anger and hostility, and the development and progression of heart disease (Chida & Steptoe, 2009; Kubzansky & Kawachi, 2000). No randomized controlled trial has investigated the effects of exercise training on the signs and symptoms that characterize patients with GAD.

There also is a need to compare the psychological consequences of resistance exercise training (RET) and aerobic exercise training (AET). Several lines of evidence suggest that RET can be as effective as AET for the improvement of anxiety and other signs and symptoms associated with GAD. This evidence includes: (1) compared to AET, RET has shown efficacy for attenuating symptoms of anxiety, depression, fatigue, and pain (O’Connor, Herring, & Caravalho, 2010); (2) compared to AET, RET has resulted in larger improvements in associated signs and symptoms of GAD among other samples, including fatigue among patients and healthy adults (Puetz et al., 2006; Puetz, Beasman, & O’Connor, 2008) and fatigue, quality of life, and depressive symptoms among cancer patients (Courneya et al., 2007); and, (3) given the high comorbidity of GAD and its overlapping etiology with major depressive disorder (MDD), compared to AET, RET has resulted in larger improvements in depressive symptoms and disturbed sleep among MDD patients (Singh et al., 2005).

Thus, the primary objective of this ancillary investigation was to quantify and compare the magnitudes of the effects of six weeks of RET and AET, matched on body region, time actively engaged in exercise, positive work, and weekly load progression, on signs and symptoms that characterize GAD patients. We hypothesized that both exercise conditions would result in improvements in signs and symptoms, and that, because conditions were matched, the magnitude of the effect sizes would be similar between RET and AET.

2. Methods

The detailed methods and procedures of this investigation are reported elsewhere (Herring et al., in press). The study protocol for the trial was approved by an Institutional Review Board. All volunteers provided written informed consent. Thirty women living near Athens, Georgia were recruited. Inclusion criteria were: (1) age of 18–37 years; (2) no concurrent psychiatric or medical conditions; (3) pregnancy; and, (4) body region exercised (legs). Each AET patient performed two sessions of 16 min of continuous, dynamic leg cycling exercise per week. Heart rate and RPE were obtained during the last 10 s of the 2nd, 7th and 15th minutes of each session. Session RPE was obtained following the completion of each exercise. Session RPE was obtained following the completion of each exercise.
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