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Physical activity in the treatment of Post-traumatic stress disorder: A systematic review and meta-analysis

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ABSTRACT

People with PTSD experience high levels of cardiovascular disease and comorbid mental health problems. Physical activity (PA) is an effective intervention in the general population. We conducted the first systematic review and meta-analysis to determine the effect of PA on PTSD. We searched major electronic databases from inception till 03/2015 for RCTs of PA interventions among people with PTSD. A random effects meta-analysis calculating hedges g was conducted. From a potential of 812 hits, four unique RCTs met the inclusion criteria ($n=200$, mean age of participants 34–52 years). The methodological quality of included trials was satisfactory, and no major adverse events were reported. PA was significantly more effective compared to control conditions at decreasing PTSD and depressive symptoms among people with PTSD. There was insufficient data to investigate the effect on anthropometric or cardiometabolic outcomes. Results suggest that PA may be a useful adjunct to usual care to improve the health of people with PTSD. Although there is a relative paucity of data, there is reason to be optimistic for including PA as an intervention for people with PTSD, particularly given the overwhelming evidence of the benefits of PA in the general population. Robust effectiveness and implementation studies are required.

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1. Introduction

Post-traumatic stress disorder (PTSD) typically occurs following exposure to potentially traumatic events including war, torture, physical or sexual assault or natural disasters, with an estimated lifetime prevalence of 6.8% (Kessler et al., 2005). PTSD is particularly prevalent and of increasing concern amongst certain populations including first responders (police officers, paramedics, firefighters) and veterans. For example, the estimated point-prevalence of PTSD among combat veterans is reported to be as high as 23% (Fulton et al., 2015). Associated adverse consequences of PTSD include severe impairments in psychosocial functioning (Zatzick et al., 2002), significantly increased risk of suicide and suicidal ideation (Jakupcak et al., 2009) and substance abuse and dependence (Schnurr et al., 2005).

In addition to the adverse impact on an individual's mental health and wellbeing, people with PTSD have a high prevalence of physical comorbidity including obesity, diabetes and metabolic syndrome (Boscarino, 2004; Bartoli et al., 2015; Roberts et al., 2015; Rosenbaum et al., 2015b), contributing to premature mortality. For example, it was recently demonstrated that the pooled prevalence of metabolic syndrome was 38.7%, with abdominal obesity observed in an estimated 49.3% of people with PTSD. Compared with matched general population controls, people with PTSD had an almost doubled risk of metabolic syndrome (Rosenbaum et al., 2015b). The reasons are multifactorial yet include high rates of smoking (Fu et al., 2007), poor sleep behaviours (Lamarche and De Koninck, 2007; Talbot et al., 2013) and low levels of physical activity compared to the general population (de Assis et al., 2008). Despite the known cardio-protective benefits of increased physical activity for both the general population and those experiencing mental illness (Vancampfort et al., 2015a), exercise and physical activity are yet to be acknowledged as a key component of the treatment of PTSD (Australian Centre for Post-traumatic Mental Health, 2013). Current evidence-based practice guidelines for treating PTSD include predominantly trauma-focused cognitive-behavioural therapy (CBT) and pharmacological therapy (selective serotonin reuptake inhibitors) (Australian Centre for Post-traumatic Mental Health, 2013). A 2010 Cochrane review into the effect of sports and games on PTSD highlighted the lack of available evidence for exercise as a treatment or co-treatment option (Lawrence et al., 2010), at the time finding no RCTs eligible for inclusion. Five studies were identified that evaluated exercise and or sports based interventions for PTSD, however, the generalizability of the findings was limited due to considerable methodological weaknesses, including a lack of randomization, small sample sizes, and the inclusion of interventions evaluating play-based therapy, considered a psychological intervention. Given the growing recognition of physical activity and exercise as an important component of treatment for various mental disorders (Rosenbaum et al., 2014; Vancampfort et al., 2014), the current study aimed to conduct a systematic review and meta-analysis of the evidence for both physical activity and exercise (i.e., a subset of physical activity that is planned, structured, and repetitive and has as a final or an intermediate objective (Caspersen et al., 1985) in the treatment of PTSD. The primary aim was to evaluate the impact of physical activity and exercise interventions on PTSD symptoms, while the secondary aims of this review was to determine the impact of physical activity and exercise on other important functional and psychological outcomes associated with PTSD including depression, sleep behaviour and cardiovascular risk (anthropometry).

2. Methods

2.1. Procedure

This systematic review was conducted in accordance with the MOOSE guidelines (Stroup et al., 2000) and in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) standard (Moher et al., 2009). Two independent authors (SR, DV) searched Medline, PsycARTICLES, Embase and CINAHL from database inception to March 1st, 2015 for randomized controlled trials. Key words used were “physical activity”, “exercise” AND “Post-traumatic stress disorder” in the title, abstract or index term fields. Manual searches were also conducted using the reference lists from recovered articles and the Cochrane review of Lawrence et al. 2010. After the removal of duplicates, both reviewers screened the titles and abstracts of all potentially eligible articles. Both authors applied the eligibility criteria, and a list of full text articles was developed through consensus. The two reviewers then considered the full texts of these articles and the final list of included articles was reached through consensus. A third reviewer (BS) was available for mediation throughout this process.

2.2. Quality assessment

Key features of study design that impact upon methodological quality including the concealed allocation of participants to groups and the blinding of assessors are reported for all studies included in the primary analysis (see Table 1). Publication bias was tested using the Egger's regression method (Egger et al., 1997) and Begg–Mazumdar test (Begg and Mazumdar., 1994), with a p-value <0.05 suggesting the presence of bias. In addition, a funnel plot was created, in which the study-specific effect estimates are displayed in relation to the standard error in order to assess the potential presence of publication bias.

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