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## STUDENTS' CORNER

### Knowledge Translation of Aerobic Exercise as an Alternative Treatment for Major Depressive Disorder in Adults

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#### Abstract

**Background:** Depression is a leading cause of disability globally and evaluating alternative treatments for depression and communicating results through knowledge translation resources is important. **Purpose:** This student-driven, evidence-based, review is a supplementary narrative to a knowledge translation video designed to educate the general public with regards to the use of aerobic exercise as an alternative treatment for depression in adults. **Results:** Evidence indicates that aerobic exercise is similarly as effective as pharmacotherapy or psychotherapy for the treatment of mild or moderate depression, and an effective adjunctive treatment for moderate to severe depression. **Conclusion:** The effectiveness of aerobic exercise as an alternative treatment to pharmacotherapy and psychotherapy is examined. Evidence-based dosage recommendations for patients are discussed.

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Keywords: Physical Activity, Exercise, Kinesiology, Mental Health, Antidepressants, Mood Disorders, Psychotherapy, Knowledge Transition, Health Promotion

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#### Introduction

The primary purpose of this student-driven, narrative review and commentary is to supplement an evidence-based knowledge translation video designed to educate the general public on the use of aerobic exercise as an alternative treatment for depression in adults. Depression is a common mental disorder with 322 million people diagnosed globally and is the leading cause of disability worldwide (WHO, 2017). The central feature of major depression disorder is having either a depressed mood or loss of interest or pleasure in almost all activities, over a period of

greater than two weeks (American Psychiatric Association, 2013). Major depressive disorder (MDD) ranges in duration and severity and is diagnosed by a medical doctor (American Psychiatric Association, 2013). Depression causes a greater decrement to health in comparison to somatic diseases including angina, arthritis, asthma, and diabetes (Moussavi et al., 2007). Depression is traditionally treated through the use of antidepressant medication or psychological treatments (World Health Organization, 2018). Many patients do not respond to antidepressant medication or experience negative side effects

(Blumenthal et al., 2007). No single treatment for depression is effective for every individual and as a result, alternative treatments options that are accessible and affordable have become a significant research interest (Fava et al., 2003; Brosse et al., 2002).

Exercise is structured physical activity, undertaken with the goal of increasing health or physical fitness (Cooney et al. 2013; Warburton, Nicol, & Bredin, 2006b). Both aerobic and anaerobic exercise are effective in reducing depression symptoms with no superiority between exercise forms (Stanton et al., 2013). Both physiological factors and psychological factors are cited as potential mechanisms in reducing depression symptoms through exercise (Cooney et al., 2013; Craft & Perna, 2004). This narrative will present a summary for the effectiveness of aerobic exercise prescription in comparison to pharmacotherapy and psychotherapy. As well as summarize the current state of knowledge on the dosage and delivery of exercise prescription for patients, as treatment for major depression disorder in adults.

### Methods

Using the University of British Columbia's (UBC) Summon 2.0 Search Database, search terms included "aerobic exercise, treatment, depression, adults" were used to collect recent high-quality randomized control trials and systematic reviews. Results from these studies were analysed. A 90 s script and knowledge translation video vignette using Videoscribe® animation technology was created. Current patients with depression and medical doctors were the target audience for this knowledge translation piece. Relevant symbolism and language

appropriate for this target audience was used.

### Key Findings

A large body of evidence demonstrates that people who are more physically active are less likely to have major depressive disorder or depression symptoms (Loprinzi, 2013; Goodwin, 2003; Bhui & Fletcher, 2000; Sale, Guppy, & Sayed, 2000; Dunn, Trivedi & Kampert, 2005; Wyshak, 2001). Using objective assessments of physical activity researchers found a negative correlation between depression and all levels (light to vigorous) of physical activity (Loprinzi, 2013). Low levels of physical activity during childhood were associated with increased prevalence of depression in adults (Jacka et al., 2011).

Aerobic exercise has been shown across a substantial body of research to be as effective as pharmacotherapy, psychotherapy or a combination thereof in reducing depression symptoms (Mead et al., 2009; Blumenthal et al., 1999; Rethorst et al., 2009; Blumenthal et al., 2007; Schuch et al., 2016; Babyak et al., 2000; Blumenthal, Smith, & Hoffman, 2013). A meta-analysis found that aerobic exercise is effective for the treatment of depression as both a stand-alone treatment or as a concurrent treatment with pharmacotherapy and/or psychotherapy (Perraton et al., 2010; Cooney et al., 2013).

The exact mechanisms underlying the antidepressant effects of exercise remain to be fully elucidated; however, several physiological and psychological factors have been acknowledged (Cooney et al., 2013; Craft & Perna, 2004). Example proposed physiological mechanisms to explain the benefits of exercise in reducing depressive symptoms include increased release of  $\beta$ -endorphins,

increased availability of neurotransmitters, increased turnover of brain-derived neurotropic factor, increased body temperature, and a reduction in cortisol levels (Cooney et al., 2013; Craft & Perna, 2004). Psychological mechanisms include the distraction hypothesis (physical activity distracts from depressive thoughts) and increased self-efficacy (Cooney et al., 2013; Craft & Perna, 2004).

Aerobic exercise may serve as an alternative treatment for mild to moderate depression providing a viable alternative to antidepressant medication (Kvam et al., 2016; Ravidran et al., 2018). This may be particularly beneficial for patients who do not want traditional treatments, have limited financial resources, are not responding to their current treatment plan, and/or are on a wait list for treatment (Kvam et al., 2016).

Evidence for the long-term effects of exercise are less clear (Ravindran et al., 2018). The Duke SMILE study gives support for long-term benefits of aerobic exercise for depression (Babyak et al., 2000). Patients in all intervention groups (aerobic exercise, sertraline therapy, or a combination of both) experienced equal and significant improvement (Babyak et al., 2000). However, ten months after treatment completion, individuals in the exercise group had significantly reduced rates of relapse (Babyak et al., 2000). Exercising independently after treatment completion was significantly associated with lower relapse rates (Babyak et al., 2000).

Research suggests a dosage of aerobic exercise that is consistent with public health recommendations, or a total volume of 150 min/wk of moderate to vigorous activity or 1000 kcal/wk (150 to 400 kcal/d) (Dunn et al., 2005; Perraton et al., 2010; Warburton, Nicol & Bredin,

2006a). It is important to note that one systematic review found positive effects of aerobic exercise as a treatment method for depression with dosages less than public health recommendations with average dosages of 60–80% of maximum heart rate, three 30-minute sessions per week (Perraton et al., 2010). Therefore, practitioners should consider both the physical fitness and unique characteristics of the patient when prescribing exercise interventions (Ravidran et al., 2018; Warburton & Bredin, 2016).

Evidence indicates exercise should be structured and supervised by a qualified exercise professional (Perraton et al., 2010; Schuch et al., 2016). Group exercise is beneficial to enhancing the perception of enjoyment, feeling of belonging in a social context, and social support (Ranjbar et al., 2015; Gore, Farrell & Gordon, 2001). Duration of supervised exercise should be greater than 8-12 wk (Stanton & Reabum, 2014; Perraton et al., 2010). Based on the collective evidence, the Canadian Network for Mood and Anxiety Disorders concludes there is Level 1 evidence in support of the use of exercise as viable treatment for major depressive disorder with no form of exercise (aerobic versus anaerobic) superior to another (Ravidran et al., 2018; Stanton et al., 2013). Level 1 evidence is the greatest strength evidence comprised of meta-analysis with narrow confidence intervals or greater than two placebo controlled randomized control trials with adequate sample size (Ravidran et al., 2018).

Exercise is recommended as the first-line monotherapy treatment for mild to moderate MDD and as second-line adjunctive treatment for moderate to severe MDD due to inconclusive evidence on the long-term effects of exercise in

reducing depression symptoms (Ravidran et al., 2018).

### Conclusion

Collectively, there is a growing body of compelling research supporting the effectiveness of aerobic exercise as an alternative or adjunctive treatment (dependent on severity level) in adults with major depressive disorder (Ravidran et al., 2018). There are currently no established exercise dosage guidelines; however, the collective research indicates an effective dosage target of 30 min/d of supervised moderate-intensity exercise, three or more times weekly for greater than 9 wk (Stanton & Reabum, 2014; Perraton et al., 2010; Nyström et al., 2015). An evidence-based dosage lower than public health recommendations has implications for health professionals in patient education and knowledge translation (Warburton & Bredin, 2016). Greater research is needed to further understand the dose-response relationship of aerobic exercise and reduction in depression symptoms. Additionally, future research should continue to investigate the long-term effects of aerobic exercise on depression symptoms.

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### Authors' Qualifications

The authors' qualifications are as follows: Jennifer Boughner, BKin; Darren Warburton, MSc, PhD, HFFC-CEP.

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