



Investigating the effects of Physical Activity Counselling on depressive symptoms and physical activity in female undergraduate students with depression: A multiple baseline single-subject design



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ABSTRACT

Background: Depression is one of the most common health problems faced by university students. Evidence supports that physical activity can significantly reduce the risk of depression, though activating this population remains challenging. One potential evidence-based strategy, to help people become more active, is Physical Activity Counselling (PAC). The current study examined the effects of a two-month PAC intervention on depressive symptoms and physical activity in female undergraduate students with depression.

Methods: The study followed a multiple baseline, single-subject design with five participants. There were four separate study phases: baseline, intervention, end point and follow-up. Physical activity was measured objectively using accelerometers and self-reported measures of depressive symptoms and physical activity were collected via online surveys.

Results: Visual analyses revealed that depressive symptoms decreased and self-reported physical activity increased from baseline throughout the duration of the study in all five participants. Statistical analyses supported these results. Cohen's effect size estimates of grouped averages revealed that decreases in depressive symptoms and increases in self-reported physical activity from baseline throughout the duration of the study were large.

Conclusions: These results provide initial support for PAC as a potential method of increasing physical activity and reducing depressive symptoms in female undergraduate students with depression.

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1. Introduction

Depression is defined by the World Health Organization (WHO) as, "a mental disorder, characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness, and poor concentration" (Depression, para. 1). Depression is a growing public health concern, with rates as high as 9.0% in females aged 15 to 24 (Statistics Canada, 2016). According to the most recent available data, the median age of Canadian university students is 22.8 years (Statistics Canada, 2010), thus it is not surprising that depression is reported as one of the most prevalent health issues among university students

(Ibrahim, Kelly, Adams, & Glazebrook, 2013; Nunes et al., 2014).

University students are at a particularly high risk of mental illness for a variety of reasons including, high academic demands, transitioning to a new environment, changes in sleep and eating routines and a decrease in physical activity (Buchanan, 2012; Ibrahim et al., 2013; Wilson et al., 2014). It has been suggested that decreases in physical activity, that commonly occur as a result of the transition from high school to university, are associated with a decrease in mental health (Bray & Born, 2004). On the other hand, those who are able to maintain physical activity during entry into university, have reported better physical and mental health (Bray & Born, 2004). The psychological benefits of being physically active are comparable to pharmacology for depression (Stanton, Happell, Hayman, & Reaburn, 2014). Indeed, physical activity has been widely supported in research to reduce the risk of depression (Parker et al., 2016; Pereira, Geoffroy, & Power, 2014; Schuch et al., 2016; Wegner et al., 2014). In addition to the mental health benefits

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of being active, physical activity also reduces the risk of several chronic illnesses including, but not limited to, coronary heart disease, heart failure, osteoarthritis, diabetes and chronic obstructive pulmonary disease (Hoffmann et al., 2016; Pedersen & Saltin, 2015). The Canadian Physical Activity Guidelines recommend adults ages 18–64 accumulate at least 150 min of MVPA per week, in bouts of 10 min or more in order to achieve these health benefits (CSEP, 2011). What is concerning, is that 4 in 10 university students are considered physically inactive (Pengpid et al., 2015). Fortunately, physical activity is a modifiable risk factor (Thornton et al., 2016) and interventions have demonstrated to be effective in increasing physical activity levels among individuals with depression (Krogh, Nordentoft, Sterne, & Lawlor, 2010; Parker et al., 2016). The problem is determining which physical activity interventions are the most effective in fostering short and long-term benefits.

Physical Activity Counselling (PAC) is one type of physical activity intervention that has gained support in research as an effective approach to increasing physical activity levels (Fortier et al., 2011; Gao et al., 2016). Physical Activity Counselling is based on Motivational Interviewing (MI; Miller & Rollnick, 2013) and is rooted in the Self-Determination Theory (SDT; Deci & Ryan, 1985). Motivational Interviewing is a type of counselling which guides individuals toward positive change by increasing one's own motivation for change. Motivational Interviewing also utilizes evidence based behaviour change techniques such as reflections and goal setting (Hardcastle, Fortier, Blake, & Hagger, 2016; Miller & Rollnick, 2013). Interventions based on MI have shown significant increases in physical activity (Fortier et al., 2011; Hardcastle, Taylor, Bailey, & Castle, 2008).

Physical Activity Counselling is also based on SDT. The SDT describes the different motivations that people have to act in certain ways (Deci & Ryan, 1985). According to this theory, there are three types of motivation including amotivation (not at all motivated), extrinsic motivation (doing something for instrumental reasons, such as a reward) and intrinsic motivation (doing something for the satisfaction and enjoyment that it brings) (Deci & Ryan, 1985). Intrinsic motivation is the most self-determined motivation and is associated with maintenance of physical activity (Teixeira, Carraça, Markland, Silva, & Ryan, 2012a). Motivation is not unalterable, in fact, a sub theory of SDT known as the Basic Needs Theory (BNT), suggests that self-determined motivation can be obtained by facilitating the three basic psychological needs of autonomy, competence and relatedness (Deci & Ryan, 2010). The results of a meta-analysis support the BNT, indicating that facilitating the three basic psychological needs results in increased self-determined motivation and ensuing physical and mental health (Ng et al., 2012).

Experts have recognized strong similarities and overlap between the SDT and the intervention of MI, even though the latter was not initially developed based on SDT (Teixeira, Palmeira, & Vansteenkiste, 2012b). Specifically, the spirit/counselling style of MI addresses the three basic psychological needs which promote self-determined motivation and future behaviour such as physical activity (Miller & Rollnick, 2012; Teixeira et al., 2012b). For example, being empathetic, avoiding judgement and developing a trusting partnership between the counsellor and client are core MI techniques which contribute to a client's feelings of relatedness (Resnicow & McMaster, 2012). Through motivational language, such as providing positive feedback, the counsellor is able to enhance a clients' perceived competency to make a behaviour change (Resnicow & McMaster, 2012). Finally, autonomy is a fundamental element of MI which is facilitated through the use of many techniques such as asking for permission to provide information and offering a variety of change options for the client to choose from (Miller & Rollnick, 2012; Teixeira et al., 2012b).

Although there are clearly similarities between the theory of SDT and the MI intervention, which PAC is based on, there remains disconnect between the two; SDT has yet to be fully accepted as the theoretical framework for MI. Thus, given that the PAC intervention in the present study is based on facilitating the basic needs of the SDT and follows the counselling style of MI, if levels of physical activity and ensuing depression improve during this PAC intervention, support would be provided for the use of SDT as the theoretical foundation of MI.

Previous research has supported the effectiveness of PAC in improving levels of physical activity among non-clinical populations (Fortier et al., 2011; Gao et al., 2016). Additionally, trials are currently underway to investigate the effectiveness of similar SDT and MI counselling-based physical activity interventions in improving mental health (Farrand et al., 2014; Haase, Taylor, Fox, Thorp, & Lewis, 2010). However, no previous research has investigated the effects of PAC in a population of female undergraduate students with depression specifically, which is why the present study is so novel. It is particularly important to target this population, as the rates of depression and antidepressant use are continually increasing among university students. Indeed, university representatives, media and research have emphasized the need for more accessible mental health resources for students (Lunau, 2012; Nunes et al., 2014), making the present study particularly timely. Previous research has suggested that there are gender differences in help seeking behaviours for depression. Specifically, women are more likely to seek counselling and are more open to talking about their feelings than men (Mackenzie, Gekoski, & Knox, 2006; Morgan, Ness, & Robinson, 2003). Since PAC follows the counselling style of MI, women might be more likely to utilize and respond positively to this type of physical activity intervention in particular. Additionally, one of the main barriers to help seeking in the young population is fear of stigma (Rickwood, Deane, Wilson, & Ciarrochi, 2005). A physical activity intervention for depression, such as PAC, might be viewed more positively among students than traditional psychotherapy, thus making them more likely to use this type of treatment. These findings, combined with the high prevalence of depression seen in this population, further justifies why the present study focuses on female students in particular. Finally, while it is widely known that physical activity can significantly reduce the risk of depression, we still do not know how to get individuals with depression moving. This study provides a potential approach to activating those with depression, in an effort to stimulate a shift from knowledge to action.

The present study

The primary aim of this study was to improve levels of depression among female undergraduate students by implementing a two-month PAC intervention. The study involved four phases including: baseline, intervention, end point and follow-up. The specific objectives and hypotheses of the present study were to: 1) Examine the influence of a two-month PAC intervention on the severity of depressive symptoms of female undergraduate students with depression (main outcome). It was hypothesized that the severity of depressive symptoms would reduce from baseline to intervention (Parker et al., 2016; Schuch et al., 2016). The improvement in depressive symptoms was anticipated to be maintained at end point and follow-up. 2) Examine the influence of a two-month PAC intervention on both objective and self-reported physical activity levels of female undergraduate students with depression (secondary outcomes). It was hypothesized that objective and self-reported physical activity levels would increase from baseline to intervention (Fortier et al., 2011; Gao et al., 2016). The improvement in physical activity levels, both objective and self-

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