

Conceptual Paper

Physical Activity as Treatment for Depression in Recreation Therapy

Transitioning from Research to Practice

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Abstract

Depression is a common primary and secondary condition among recreational therapy clients, and is a threat to engagement and outcomes of recreational therapy. Recreational therapists are able to respond to depression through physical activity. A substantial amount of recent research has uniformly identified that there exist significant positive effects of physical activity on both clinical depression as well as depression among non-clinical populations. The research evidence in depression treatment and depression prevention supports physical activity as an intervention. This article reports types of exercise known to alleviate depression, the neuroanatomical structures affected by physical activity, and the effects of these structure changes on depressive symptoms. In addition, issues related to motivation regarding physical activity engagement as well as ways to respond to such issues using self-efficacy theory and self-determination theory are discussed. With an awareness of this current information, recreational therapists could integrate physical activity more intentionally into the APIED process to help their clients manage depression.

Keywords

Depression, exercise, physical activity, recreational therapy, self-determination theory, self-efficacy theory

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Depression is becoming an increasingly important factor to be addressed in recreational therapy (RT) practice. Depression is not only a common diagnosis among mental health individuals, but also a common comorbidity among rehabilitation and long-term care residents. Depression predicts poor recovery outcomes among mental health populations (Sands & Harrow, 1999; van Balkom et al., 2008) as well as poor rehabilitation outcomes and efficiency among physical rehabilitation populations (Gillen et al., 2001; Hadidi et al., 2009) because of decreased motivation to engage in treatment. Physical activity and exercise have gained increasing attention as a treatment of depression; however, there has been a general neglect of physical activity as an intervention in mental health care (Callaghan, 2004; Rosenbaum et al., 2016), because motivation for physical activity is difficult to maintain (Iso-Ahola, 2013). Recreational therapists could effectively address the issue of motivation and assume leadership roles in physical activity intervention for depression. RT theories such as Health Protection/Health Promotion (HP/HP) Model (Austin, 1998) and Flourishing through Leisure Model (Anderson & Heyne, 2012) support the influence of self-efficacy and self-determination, both of which are important ingredients for motivation. RT professionals influence self-efficacy by facilitating the sources of self-efficacy such as mastery experience, verbal persuasion, and vicarious experience (Bandura, 1994). A strengthened self-efficacy is foundational to self-determination, which fosters sustainable engagement in physical activity. The aims of this article are to present the evidence of physical activity effects on depression and review theories that address motivation, which support the RT use of exercise to address depression.

Although RT researchers have been studying physical activity extensively (e.g., Curtis et al., 2015; Skalko, Burgess, & Janke, 2016; Wilhite, Martin, & Shank, 2016; Zoerink & Carter, 2015), minimal attention has currently been given to the effects of physical activity on depression (Austin, 2018). For example, in Mobily's (2009) review of exercise and physical activity in RT services, none of the work cited specifically noted samples with depression, and very few included samples with psychiatric diagnoses. In addition, Broach's (2016) chapter on exercise as a facilitation technique in RT cites a total of seven studies supporting exercise or physical activity's effects on depressive symptoms, yet only two of these studies were published in the last 20 years and only one study employed a sample diagnosed with depression. Other recent treatments of the topic in RT (e.g., Lewis, 2015; Porter, 2016) similarly provide only the briefest evidence supporting the use of physical activity or exercise as an RT intervention for depression. Thus, the benefits of physical activity for managing depression warrant greater dissemination within the literature of RT. The aims of this article are to review research evidence related to physical activity and depression and to share recommendations for RT practice that have been derived from this research.

Physical Activity and Exercise

Although the terms physical activity and exercise are often used interchangeably, they have separate meanings. Some researchers define physical activity as "bodily movement from skeletal muscle contractions with energy expenditures" (Sharpe, Collins-McNeil, Jones, & Bailey, 2016, p. 5), and others as "any type of muscle movement that increases energy consumption; it includes everything from regular exercise to gardening and other domestic chores" (Nyström et al., 2017, p. 86). Thus, physical activity

is not restricted to workouts at the gym and may include leisure time physical activities such as home gardening or walking in one's neighborhood.

Exercise may be conceptualized as a subset or subcategory of physical activity (World Health Organization, 2017). Exercise has been defined by Bouchard, Blair, and Haskell (2012) as being "performed repeatedly over an extended period of time (exercise training) with a specific external objective such as improvement of fitness, physical performance, or health" (pp. 12–13). Thus, while it is a type of physical activity, exercise involves a form of structured and repetitive physical training.

According to *Physical Activity Guidelines for Americans* (U.S. Department of Health and Human Services, 2018), the current recommended dose to promote and maintain health is at least 150 minutes a week of moderate-intensity, 75 minutes a week of vigorous-intensity, or an equivalent combination of aerobic physical activity. A little over 20% of American adults are meeting the guidelines (U.S. Department of Health and Human Services, 2018). The above recommendation has been endorsed by the American College of Sports Medicine, the Center for Disease Control and Prevention, and the American Heart Association.

Depression

Depression is a common mental health condition characterized by psychological, cognitive, and physical symptoms (the American Psychiatric Association [APA], 2013; National Institute of Mental Health [NIMH], 2015). Psychological symptoms include feeling down, feeling empty, loss of energy, diminished interest in ordinary activities, not enjoying activities once enjoyed, feelings of worthlessness and hopelessness, and irritability. Cognitive symptoms include trouble remembering details and making decisions, and poor concentration. Physical symptoms include aches or pains, headaches, disturbed sleep and appetite, and/or digestive dysfunction without a clear cause. Even if it does not reach clinically significant levels (i.e., non-clinical depression), depression affects the ability to function in daily life, particularly social functioning, and the enjoyment of family, work, and leisure. When such disruptions last at least two weeks and manifest at least five symptoms that significantly impair functioning, it is diagnosable as a major depressive disorder (MDD) in the *Diagnostic and Statistical Manual of Mental Disorder 5th Edition* (APA, 2013). A MDD, also known as a clinical depression, is characterized by a poor quality of life and a high level of utilization of health care services (Greenberg et al., 2015).

Clinical depression is also experienced as a secondary health condition among individuals who have physical and psychiatric conditions such as cancer, cardiovascular disease, diabetes, multiple sclerosis, stroke, alcoholism, and schizophrenia (Blumenthal, Smith, & Hoffman, 2012; NIMH, 2015). Clinical depression among these populations is referred to as comorbid depression. Those with comorbid depression, in fact, experience more disruptions during treatment due to decreased motivation, somatic complaints, acting out, and suicidal behaviors (Clayton & Lewis, 1981; Milani, Lavie, & Cassidy, 1996). These disruptions lead to poor outcomes in physical and psychiatric rehabilitation (Gillen et al., 2001; Hadidi et al., 2009; Sands & Harrow, 1999; van Balkom et al., 2008).

Depression is more common in women than men, with women being 70% more likely to report depression (Lewis, 2015; NIMH, 2015), and older persons who expe-

rienced depression when younger are more at risk for becoming depressed in later life (NIMH, 2015). Depressive symptoms among the young or elderly may present differently from that of adults. For example, symptoms of occurrences of depression in children include pretending to be sick, refusing to go to school, clinging to a parent, or worrying that a parent may die (Jensen et al., 2011). Similarly, older adults who are depressed may feel tired, experience trouble sleeping, experience confusion or attention deficit, or be grumpy and irritable (Fiske, Wetherell, & Gatz, 2009).

Common treatments for depression are antidepressant drugs and psychotherapy, both of which can be expensive. Antidepressants can also have unwanted side effects and carry an increased risk of cardiovascular disease (Hamer, Batty, Seldenrijk, Kivimaki, 2010). Another drawback of antidepressants is that approximately 50% of patients have been found to discontinue antidepressant therapy before its completion (Cantrell, Eaddy, Shah, Regan, & Sokol, 2006). Some also avoid going to psychotherapy because of perceived social stigma (Sirey et al., 2001). Because of these impediments, there has been growing interest in physical activity as a means to manage depression (Blake, 2012; Helgadóttir, Hallgren, Kullberg, & Forsell, 2018). Physical activity not only avoids the concerns brought on by the use of antidepressants or psychotherapy, but the cost is minimal compared to usual care, is accessible, and involves little risk (Gujral et al., 2017). Involvement in physical activity can also provide participants with a sense of power over their recovery, which may counteract feelings of hopelessness that often accompany depression (Busch et al., 2016; Mental Health Foundation, 2005; Vijay, Wilson, Suhrcke, Hardeman, & Sutton, 2015).

Research Findings Support Physical Activity and Exercise for Depression

Even though there has been a general neglect of physical activity as an intervention in mental health care (Callaghan, 2004; Rosenbaum et al., 2016), a growing number of research findings support the efficacy of physical activity on depression. This section reviews recent research evidence on treatment and prevention of depression, recommended types and intensity of activity, and neuroanatomical mechanisms that alleviate depression symptoms.

Treatment and Prevention of Depression

A number of systematic reviews of studies completed with persons diagnosed with clinical depression found positive results for the effects of physical activity on depression (Brosse, Sheets, Lett, & Blumenthal, 2002; Schuch et al., 2016; Silveira et al., 2013). For example, a meta-analysis by Schuch et al. (2016) reported that physical activity treatments for individuals who were diagnosed with clinical depression produced significant improvements in overall depressive symptoms that were measured via instruments such as the Hamilton Rating Scale for Depression (HAM-D: Hamilton, 1967) and the Beck Depression Inventory II (Beck, Steer, & Brown, 1996). Other studies reported that patients with clinical depression achieved remission through physical activity interventions (Blumenthal et al., 2007; Dunn, Trivedi, Kampert, Clark, & Chambliss, 2005). Furthermore, antidepressant effects of physical activity interventions were found among those who do not respond to medication (Mota-Pereira et al., 2011). Exercise has also been found to be effective in lowering depression among

those with comorbid depression and may be tailored to treat both the primary illness as well as comorbid depression (Craft & Landers, 1998; Dauwan, Begemann, Heringa, & Sommer, 2016; Kelley, Kelley, & Hootman, 2015; Levin, Greenwood, Singh, & Newton, 2018; Milani et al., 1996).

The antidepressant effects of physical activity and exercise have also been found among non-clinical populations (Brown, Pearson, Braithwaite, Brown, & Biddle, 2013; Conn, 2010; Dinas, Koutedakis, & Flouris, 2011; Ku et al., 2018; Robertson, Robertson, Jepson, & Maxwell, 2012). In these studies, BDI-II (Beck et al., 1996), the Center for Epidemiological Studies Depression measure (CES-D; Radloff, 1977), or the Geriatric Depression Scale (GDS; Sheikh & Yesavage, 1986) were used to measure overall depressive symptoms. For example, in a two-year prospective cohort study of 285 older adults, reported time spent in moderate to vigorous as well as light physical activity was inversely related to depressive symptoms as measured by the Geriatric Depression Scale (Ku et al., 2018). From their meta-analysis, Rebar et al. (2015) concluded that there was “a comprehensive body of high-quality evidence that physical activity reduced depression and anxiety in non-clinical populations” (p. 1).

Considering the antidepressant effects of physical activity on non-clinical populations, findings from recent depression prevention studies with physical activity interventions are not surprising. From their systematic research review, Mammen and Faulkner (2013) concluded that physical activity “may serve as a valuable mental health promotion strategy in reducing the risk of developing depression” (p. 649). Similarly, Stanton, Happell, and Reaburn’s (2014) research review found evidence that long-term physical activity reduces the risk of future depression. Finally, Schuch et al. (2018), in a meta-analysis of 49 prospective cohort studies of physical activity and the development of depression, concluded that physical activity provided protective effects regardless of age or geographical world region.

Types and Intensities of Effective Activities

A large number of physical activities have been found to be effective in the prevention and treatment of depression. A research review to identify exercise program variables of interventions to decrease depression indicated that both aerobic and non-aerobic exercise were successful in treating depression. The most common frequency was three times a week for 12 weeks. Stanton and Reaburn (2014) concluded:

Taken together, it would seem that a program of supervised aerobic exercise comprising indoor or outdoor walking, stationary cycle or cross trainer exercise in either group or individual or combined formats, performed three or four times weekly, undertaken at low to moderate intensity or at the participants’ preferred intensity, with sessions lasting 30-40 min is beneficial in the treatment of depression. (p. 181)

Walking appears to be a widely used activity to reduce depression. To bring about reductions in depression, adults have been found to profit from 30 minutes of accumulated physical activity of moderate intensity (such as walking fast) on most days of the week (Carek, Laibstain, & Carek, 2011). As an activity, walking has been found to have a statistically significant, large effect on symptoms of depression for several populations (Robertson et al., 2012). A research study that examined individuals’ preferences

for activities for depression reduction found walking to be the most preferred. Walking was followed by weight lifting, yoga, and dance; men preferred weight lifting, while women desired yoga (Busch et al., 2016).

In regard to depression reduction in older adults, the intensity of physical activity does not appear to take on an important role (Flint et al., 2017). Lower intensity physical activity may be sufficient to bring about reductions in depression in late life depression (Zanetidou et al., 2017). Finally, in terms of prevention, a research review found that even low amounts (frequency, duration, intensity) of physical activity protect against the likelihood of depression (Teychenne, Ball, & Salmon, 2008). Similarly, Ku and colleagues (2018) reported light physical activity reduced the risk of subsequent depression in later life. In preventing the reoccurrence of depression, research has indicated either moderate or vigorous activity twice a week reduced the likelihood of developing future depression (Stanton et al., 2014).

Changes in Brain Functions and Structures as Mediators of the Relationship between Physical Activity and Depression

Recent research indicates that the mechanisms of these antidepressant effects involve changes in the brain. For example, physical activity addresses specific depressive symptoms such as depressed mood, cognitive dysfunction, and disturbed sleep. Improvements in these symptoms are associated with improved brain functions. Physical activity, for example, decreases insomnia of individuals with clinical depression (Rethorst et al., 2013), and improved sleep duration rests the brain. The rested brain restores cognitive and emotional brain functions (Altena et al., 2008; Goldstein & Walker, 2014). Improved mood is one of the major outcomes derived from physical activity, which is associated with increased hormones and neurotransmitters in the brain. For example, physical activity activates the pituitary gland and it triggers the increased secretion of β -endorphin (Dinas, Koutedakis, & Flouris, 2011): Another study reported that physical activity increases serotonin production (Ji et al., 2017); increases in both are associated with improved mood.

The improved brain functioning as a result of physical activity might be explained by the structural change in the brain. To date, it is known that typical characteristics of depression such as poor emotional regulation and executive functioning are associated with certain brain structures and is evidenced by low volume of these structures (Gujral, Aizenstein, Reynolds, Butters, & Erickson, 2017). Recent studies, introduced in the next paragraph, report increased volume of these brain structures through physical activity appear to be direct causes of alleviating depressive symptoms.

The brain structures that are affected by physical activity are the hippocampus, anterior cingulate cortex (ACC), striatum, and white matter of the brain (Gujral et al., 2017). The hippocampus is implicated in depression as it plays a role in stress regulation, cognition, and affective processing (Duman & Monteggia, 2006). Among people with depression, hippocampal volume has been consistently found to be smaller when compared to people without depression, while positive associations between exercise/fitness and hippocampal volume are highly replicated (Gujral et al., 2017). Similarly, the ACC is implicated in higher level executive and emotional processing and has been found to be smaller among individuals with depression (Koolschijn, van Haren, Lensvelt-Mulders, Hulshoff Pol, & Kahn, 2009). The ACC also appears to respond to physical activity interventions with significant volume increases found from brisk walking

interventions for as short as 6 months (Ruscheweyh et al., 2011). The striatum is implicated in depression in affective processing, executive function, motivation, and motor functions (Gujral et al., 2017). Although there is indication that physical activity may be associated with greater striatal volume, the evidence is limited. Finally, microstructural integrity of the white matter of the brain is implicated in depression, principally through its roles in interhemispheric communication and in linking the ACC to other limbic regions. At present, there appear to be indications that physical activity is related to improvements in microstructural integrity of white matter; however, the evidence is limited to a small number of randomized controlled trials (Gujral et al., 2017). Overall, the increased volume of certain brain structures associated with emotional regulation, motivation, and executive functions are known to result from physical activity. These improved brain functions might be foundations of behavioral changes such as social participation after prolonged social withdrawal (Goodman, Geiger, & Wolf, 2016; Harvey et al., 2018).

Recreational Therapy Practice: Theories and Evidence

Recreational therapists should incorporate physical activity to reduce depressive symptoms not only for individuals with clinical depression, but also for individuals with comorbid depression as well as individuals who exhibit non-clinical levels of depression. Activities such as walking, weight lifting, yoga, and dance are preferred by many, but recreational therapists should explore other activities that are potentially more preferred by clients. In addition, recreational therapists should monitor the intensity of the physical activity depending on the purpose and the population. For example, intensity of physical activity does not matter for depression prevention while it needs to be at least moderate intensity for depression reduction; however, lower intensity might be sufficient for depression reduction if working with older adults.

Strategies based on self-efficacy and self-determination theories (Knapen & Vancampfort, 2014; Knapen et al., 2015) have the potential to enhance physical activity interventions provided by recreational therapists. To set realistic goals, recreational therapists assess physical fitness levels and activity preferences of the client, which are foundational to programs based on the client's preferences. In addition, recreational therapists adapt the program to the individual's health status and physical abilities. These strategies enhance self-determination by enabling client choice and facilitating mastery experiences leading to success and improved self-efficacy.

One common challenge of implementing physical activity intervention for clients with depression is motivation. Because of the characteristics of depression (inactivity, helplessness), clients may not be motivated to engage in physical activity programs. Although there are a variety of reasons why clients are not motivated, in some cases, verbalized low motivation is attributed to inability to foresee enjoyment from the activity. This condition is referred to as anticipatory anhedonia, and is known as a common challenge for clients to engage in pleasurable activity like leisure (Sherdell, Waugh, & Gotlib, 2012). To encourage a client to start engaging in physical activity, recreational therapists use extrinsic rewards such as a token economy along with verbal encouragement (Nagata et al., 2018). Increased physical activity influences the motivation for continued engagement in physical activity (Gram et al., 2014). The recreational therapists then use debriefing, journaling, and mindfulness to promote client awareness of

the outcomes of physical activity and motivate continued participation. This approach utilizes self-determination theory (Ryan & Deci, 2000), allowing the initial extrinsic motivation to foster intrinsic motivation.

Recreational therapists allow the clients to have more choice and control over the course of the treatment, as hypothesized by the HP/HP model (Austin, 1998). In later phases of physical activity programs, the focus should be on reinforcing perceived fitness gains, goal achievement, and sense of control over the body and its functioning as these are sources of mastery experience. In addition, recreational therapists should facilitate positive experiences derived from the activity, including fun, enjoyment, and socialization, which foster self-determination (Anderson & Heyne, 2012; Austin, 2018).

When incorporating physical activity in the program, recreational therapists should consider adding social components as well. This is one of the major implications of the Flourishing through Leisure Model (Anderson & Heyne, 2012), and it enhances self-efficacy and potentially improves antidepressant effects of physical activity. Positive social interactions among participants enhance verbal persuasion and cohesion among the physical activity treatment group that facilitate vicarious experiences—both of which are major sources of self-efficacy (Bandura, 1994). In addition, it has been suggested that the explanation for the effects of physical exercise on depression are not the physical activities per se, but the positive social interactions with others during physical activity programs (Goodman et al., 2016; Nagata et al., 2019).

The physical activity and depression literature note that to be beneficial, activities need “to be enjoyable, pleasant, or engaging” (Pickett, Kendrick, & Yardley, 2017, p. 106). Recreational therapists are equipped to create such programs and facilitate enjoyment, pleasure, and engagement. In addition, recreational therapists can incorporate physical activity into community reintegration to align with the current trend of the recovery movement, which argues the importance of social participation of individuals with mental illness, including depression (Davidson, 2016). In sum, recreational therapists can make a meaningful contribution to long-term wellness of individuals living with mental illness by providing beneficial programs that are aligned with the recovery movement through the application of the tenets of self-efficacy and self-determination theories.

Conclusions

The following seem to be warranted conclusions drawn from the literature on physical activity and depression that may be helpful to recreational therapists:

- There is strong evidence that both primary and comorbid depression may be reduced through physical activity.
- Antidepressant effects of physical activity are mediated by improved brain functions. Physical activity improves sleep quality, which restores cognitive and emotional brain functions. Physical activity increases the secretion of hormones and neurotransmitters that improve mood. Furthermore, improved mood and cognitive functions are also supported with increased mass in certain brain structures.
- All types of physical activities are effective in the treatment of depression. Recreational therapists should consider preferences of the clients.

- Physical activity of moderate intensity appears to be effective in the reduction of symptoms of depression; however, depression prevention could be expected from low intensity physical activity.
- Recreational therapists should be aware of characteristics of depression (e.g., loss of interest and motivation, fatigue, low self-worth, social fear) that may interfere with participation in physical activity.
- Recreational therapists should use self-efficacy and self-determination theories to address motivational issues. Strategies drawn from the HP/HP model (Austin, 1998) and the Flourishing through Leisure Model (Anderson & Heyne, 2012) may be employed to improve client motivation to engage in physical activity.
- In order to enhance self-efficacy, recreational therapists should set realistic goals based on client's level of functioning and their activity preferences. This strategy enhances mastery experience, which is a source of self-efficacy.
- Facilitating social interactions allows improved self-efficacy because verbal persuasion and vicarious experience are more likely to happen among the physical activity group.
- In order to enhance self-determination, recreational therapists should honor client physical activity preferences to the greatest degree possible and facilitate positive experiences derived from the activity, including fun, enjoyment, and socialization.

There has been an increasing interest in physical activity as an intervention in mental health care. Recreational therapists are in an advantageous position to deliver physical activity programs compared to other health care professionals (Mobily, 2009). The evidence base for physical activity and depression and theoretical models for the implementation of physical activity programs introduced in this article provide an impetus for recreational therapists to employ physical activities with clients living with depression.

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