

Research Bulletin

Physical activity interventions for depression in young people

Does getting active work?

ISSUE

10

'Lifestyle medicine' - which refers to low-cost, low-risk interventions that focus on factors such as physical activity, sleep, and nutrition - is increasingly seen as an important part of holistic mental health care. To achieve full recovery from mental ill-health, strategies are needed that target the symptoms and functional impairments, as well as the negative physical health consequences that commonly go hand-in-hand (Sarris et al., 2014). In the context of depression, physical activity has been suggested as a stand-alone or add-on treatment, both for its potential mood-boosting properties and its ability to produce physical health benefits (Salmon, 2001). This research bulletin provides an overview of recent evidence for the use of physical activity interventions for young people (12-25 years) experiencing depression.

What is a "physical activity intervention"?

Physical activity refers to any movement of the body using the skeletal muscles that burns energy. This includes things like walking or yoga, or playing sports, through to specific exercises like running, cycling or lifting weights. Exercise is a form of physical activity that is planned, structured and repetitive, and is designed to improve or maintain aspects of physical fitness, such as aerobic capacity, strength or flexibility (American College of Sports Medicine, 2013; Garber et al., 2011). Physical activity interventions for depression in young people can include a mix of strategies, but generally fall into two categories:

1. Structured and 'prescribed' exercise, where someone supervises the young person to ensure they meet minimum exercise thresholds using specialised exercise equipment. For example cycling on a stationary bike at a moderate intensity for 30 minutes, three times a week.
2. Counseling or psychotherapy techniques like motivational enhancement or behavioral activation, aiming to increase the amount of

physical activity a young person does in their daily life. These can focus on small, incremental changes (e.g., sitting less and moving more) through to meeting specific targets (e.g., guideline recommended levels of activity).

Does physical activity influence mood? And if so, how?

There is good evidence that physical activity is an effective treatment (or treatment component) for adults experiencing clinical levels of depression (Cooney et al., 2013; Kvam et al., 2016; Nyström et al., 2015; Schuch et al., 2016b). We know less about whether it's also effective for young people. Depression treatment guidelines recommend that clinicians provide general advice about physical activity, alongside first-line interventions like cognitive behavior therapy (CBT), to young people experiencing depression (NICE, 2015). However there is no guidance about whether specific physical activity interventions should be used.



Depression treatment guidelines recommend that clinicians provide general advice about physical activity, alongside first-line interventions like cognitive behavior therapy (CBT), to young people experiencing depression

How physical activity might improve depression is not well understood, but likely involves a mix of biological and psychosocial factors (Salmon, 2001). Physical activity is thought to be associated with the release of 'feel good' hormones (e.g., endorphins), it may regulate brain chemistry linked to depression (e.g., serotonin, cortisol), and may improve sleep among other things (see Lang et al. (2016); Sarris et al. (2014); Schuch et al. (2016a); Wegner et al. (2014) for review). Physical activity may also act as a form of general behavioural activation, and provide young people with opportunities to experience a sense of social connection (if done with others), mastery, achievement, or other positive reinforcements. It may also serve as a distraction from negative thoughts or mood states (Craft & Perna, 2004; Veale, 2008).

This research bulletin summarises five recent randomised controlled trials (RCTs) that have examined whether (and how) physical activity interventions can be used to treat depression in adolescents and young adults.

Depressed Adolescents Treated with Exercise (DATE): A pilot randomized controlled trial to test feasibility and establish preliminary effect sizes. Hughes, C.W., Barnes, S., Barnes, C. et al. (2013). *Mental Health & Physical Activity*, 6(2), 119-131.

In this small US study, 30 help-seeking adolescents (12-18 years, 58% female) who were diagnosed with depression were randomly assigned to an aerobic exercise intervention or a control group (stretching exercises). The exercise intervention involved supervised, moderate intensity aerobic exercise on a treadmill or stationary bike for 30 to 40 minutes once a week, for 12 weeks. Young people also did two to three extra sessions of exercise in their own time to achieve a weekly 'energy expenditure' target. The control group did stretching exercises over the same amount of time. Parents were asked to encourage and monitor the young person's activity.

Young people in both groups showed equal improvements in clinician-rated depression symptoms and functioning after the 12-week study. Young people in the aerobic exercise group, however, had a faster rate of improvement than the stretching group (e.g., greater improvements in their mood at the six and nine week assessments). More young people in the aerobic exercise group were also in remission from their depressive disorder at the end of treatment (86%) compared to the stretching group (50%). These rates continued to improve at six-month (100% vs. 70%) and 12-month follow-ups (100% vs. 88%). Dropout during the intervention period of the study was low in both groups and young people rated the aerobic exercise intervention as effective and reported high overall satisfaction.

Take home messages It is feasible and acceptable to engage young people with clinical depression in a combination of prescribed, supervised exercise alongside exercises done in their own time. The aerobic exercise intervention appears promising given the more rapid symptom improvement and the high rate of remission that was sustained up to a year later. Larger studies are needed to confirm the findings given the small sample involved.

Sweating away depression? The impact of intensive exercise on depression. Balchin, R., Linde, J., Blackhurst, D. et al. (2016). *Journal of Affective Disorders*, 200: 218-221.

In this small South African study, 33 male university students and staff (mean age 25.4 years) who were experiencing moderate clinician-rated symptoms of depression were randomly assigned to either a light, moderate, or vigorous intensity exercise intervention. The light intensity group walked or engaged in light cycling on a stationary bike while the moderate and vigorous intensity groups cycled at respective intensities. All groups exercised for one hour, three times a week for six weeks and all sessions were supervised to ensure that participants exercised at the assigned intensity. Endorphins in participants' blood stream were also measured after exercise.

Participants in all three intensity groups showed improvements in clinician-rated depression symptoms – light by 44%, moderate by 65%, vigorous by 73%. The difference between groups was not statistically significant however, given the small number of participants. None of the exercise intensities produced an increase in endorphins, suggesting that the improvements in depression were not related to endorphin levels. The lack of a no-exercise control group means it is not possible to say that improvements in depression were caused by the exercise interventions. It's also important to note that 30% of participants dropped out of the intervention over the 6-week period.

Take home messages Exercising three times a week might improve symptoms of depression in young men, but may not be an acceptable intervention for everyone considering the high dropout rate. Due to the small study size, conclusions cannot be made about whether exercising at a particular intensity level is necessary to improve depression, or if one intensity has better outcomes than another. Larger trials with interventions of different intensities, and a no-exercise control group, are needed.



There is emerging evidence suggesting that short-term physical activity interventions may be effective and acceptable treatment options for young people experiencing mild-to-moderate depression.

The effectiveness of simple psychological and physical activity interventions for high prevalence mental health problems in young people: A factorial randomised controlled trial. Parker, A.G., Hetrick, S.E., Jorm, A.F. et al. (2016). *Journal of Affective Disorders*, 196, 200-209.

In this Australian study, 176 young people (aged 15–25, mean 17.6 years, 61% female) attending community-based youth mental health services were randomly assigned to a behavioral activation physical activity (PA) intervention or lifestyle psychoeducation (PE). Young people were experiencing mild-to-moderate symptoms of depression and/or anxiety; the majority met criteria for depression 'caseness' on a clinician-rated symptom scale, and a quarter of the sample were diagnosed with depression. None were exercising at guideline-recommended levels prior to entering the study. The PA intervention used behavioural activation techniques to increase current activity levels, via tailored and individualised activity plans and weekly goal setting. The PA group was also provided with psychoeducation, national physical activity guidelines, activity diaries and pedometers (a device that estimates the number of steps taken) to increase motivation. The PE group received psychoeducation on lifestyle factors (e.g., sleep, substance use, physical activity), but no specific strategies were discussed about how to use the information provided. Both groups received up to six weekly sessions and the session time devoted to the PA and PE components were matched across groups. All participants also received psychological therapy (either supportive therapy or problem solving therapy) alongside these interventions. A study clinician delivered all interventions.

Overall young people in both groups experienced improvements in their depression symptoms, with those in the PA group showing greater and faster symptom improvement compared to the PE group. Remission rates were also higher in the PA group on both self-report (63% vs. 44%) and clinician-rated (56% vs. 40%) depression measures. Almost one-third of participants dropped out over the 6-week period and a further 10% finished early as their symptoms improved (no difference between the two groups).

Take home messages When offered alongside a psychological intervention, a physical activity intervention, using a behavioural activation framework, may reduce symptoms of depression in young people seeking help at community-based youth mental health services. However it's unclear whether improvements are likely to be sustained over time. Importantly, this study did not use any supervised, structured or prescribed exercise to achieve these benefits. More research is needed to understand the possible mechanisms of action behind behavioural activation and physical activity that are associated with improvements in depression.

A comparative study of the efficacy of cognitive group therapy and aerobic exercise in the treatment of depression among the students. Sadeghi, K., Ahmadi, S.M., Ahmadi, S.M. et al. (2016). *Global Journal of Health Science*, 8(10), 54171.

In this small Iranian study, 46 students (mean age 21 years, 22% female) attending a university counseling centre with diagnoses of depression were randomly assigned to an exercise intervention, group CBT or a control group (unguided group meeting). All interventions took place over 8 weeks. The exercise intervention consisted of 45-60 minutes of supervised, vigorous intensity aerobic exercise three times a week and those in the CBT group received up to 12 group sessions.

Participants in both the exercise group and the CBT group showed comparable improvements on self-reported depression symptoms, compared to the control group. Drop out rates and adherence to the interventions were not reported.

Take home messages Vigorous aerobic exercise three times a week might be equivalent to group CBT in improving symptom outcomes in young people diagnosed with depression. However, this finding is based on a small sample of (mostly male) university students, and it's unclear whether these outcomes are sustained over time. A small number of studies in adults do indicate that both exercise and CBT appear to perform equally well as treatments for depression (see Cooney et al. (2013)). Larger trials comparing physical activity to more established psychological interventions are needed to confirm this study's promising finding.

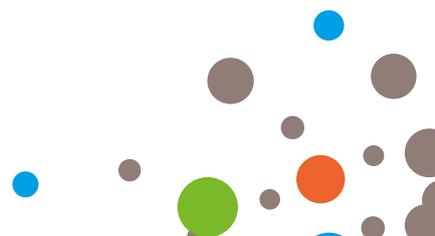
Preferred intensity exercise for adolescents receiving treatment for depression:

A pragmatic randomised controlled trial. Carter, T., Guo, B., Turner, D. et al. (2015). *BMC Psychiatry*, 15, 247.

In this study, 87 adolescents (14-17 years, 78% female) receiving treatment for depression from primary care or community-based mental health services in the UK were randomly assigned to an exercise intervention alongside 'treatment as usual' (TAU) or to TAU alone for six weeks. TAU consisted of a range of different psychological therapies and medication where required. The exercise intervention consisted of supervised, circuit training with a variety of aerobic or resistance-based exercises performed at the young person's preferred intensity level for 60 minutes. There were two sessions each week for six weeks. Twice as many young people dropped out of the TAU only group compared to the exercise plus TAU group, suggesting that exercise was an acceptable and engaging addition.

At the end of the six week intervention, young people in both groups showed similar improvements in self-reported depression symptoms, suggesting no further advantage of adding exercise to TAU. At 6-month follow-up, however, young people in the exercise plus TAU group showed greater improvements in depressive symptoms compared to the TAU group, suggesting more enduring - if delayed - benefits from adding exercise. Only half of those who started the study completed the 6 month follow-up assessment though, so the follow-up assessment may be biased.

Take home messages Young people (mostly female) receiving treatment for depression in the community appear to be open to adding an exercise intervention to their standard care, which may help improve their longer term outcomes. This preliminary finding needs to be replicated by other studies. More research is needed to understand whether exercise can produce an additional benefit over TAU for depression.





Using counseling or psychotherapy techniques to increase activity levels of young people is perhaps the best place for clinicians to start

Where to from here?

Summary of the evidence

There is emerging evidence suggesting that short-term physical activity interventions may be effective and acceptable treatment options for young people experiencing mild-to-moderate depression. However, this is based on a handful of small studies and we need larger, high quality studies to be more confident in these results.

Research supports both prescribed, supervised exercise, and physical activity that is done in the young person's own time. However, it is not clear (i) which aspects of physical activity interventions are responsible for the benefits observed, (ii) whether they should be delivered as stand-alone interventions or alongside 'treatment as usual', and (iii) whether any improvements can be sustained over time. Further research is needed to understand what type of physical activity, or how much must be done to help improve depression symptoms in young people.

What does this mean for clinical practice?

As per NICE depression treatment guidelines, every young person presenting with depression should be offered information and advice about the health and mood-boosting benefits of physical activity (NICE, 2015). Emerging evidence suggests that going a step further to include physical activity interventions as part of a young person's care may produce positive treatment outcomes. The use of structured and supervised exercise sessions, using exercise equipment (treadmills, bikes etc.) to achieve a minimum exercise threshold has a promising evidence base, but may be challenging for most clinicians to incorporate into their work with young people experiencing depression. Therefore using counseling or psychotherapy techniques to increase activity levels of young people is perhaps the best place for clinicians to start. This can include using a behavioural activation framework where individual, tailored activity plans are developed (i.e. activity scheduling) in collaboration with the young person. The aim is to provide the young person with the opportunity to experience a sense of achievement and positive reinforcement by engaging in physical activity. **The focus with this approach is to make small changes rather than to meet specific minimum thresholds.** Examples of this include increasing 'incidental activity' such as walking the dog (or walking it for a longer distance), getting off public transport a stop earlier to walk to the destination, or walking to the shop rather than driving.

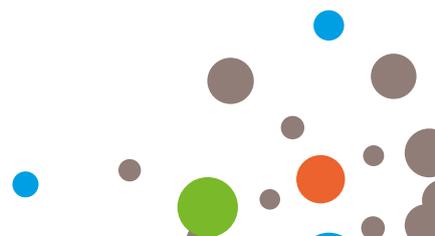
Physical activity interventions appear to be largely acceptable to young people experiencing depression (including those diagnosed with clinical depression) and can be incorporated into mental health treatments in the community. Young people appear to show a positive preference for physical activity interventions over other treatment options (e.g., psychotherapy, medication) (Jorm & Wright, 2007; Reavley & Jorm, 2011). Nonetheless, physical activity might not be suitable for everyone. Clinicians should explore the young person's individual preferences, their current physical activity levels and the presence of any physical health conditions when deciding on a treatment approach. It is also important that their physical health is monitored regularly and a review with their GP is a good place to start.

Questions for further research

- How effective are physical activity interventions when compared to established psychological interventions like CBT, or when added to usual clinical care? Large, high quality studies (e.g., randomised controlled trials) should be prioritised.
- Should physical activity interventions be offered as stand-alone interventions or as add-ons to usual clinical care? Which is most helpful for young people experiencing mild-to-moderate depression or severe depression?
- Are there differences in effectiveness between different types of physical activities, such as aerobic vs. resistance training?
- What is the optimum amount (or 'dose') of physical activity or the optimum level of intensity that is needed to help reduce symptoms of depression?
- Are the benefits of physical activity interventions sustained over time? Trials with longer follow-up periods are needed.
- What is it about physical activity interventions that explains the effect on depression? (e.g., is the effect explained by factors such as increased social connection or improved physical health, or both?) Having a better understanding of why these interventions work will help the development of better treatment approaches.
- Are there physical health benefits for young people with depression who engage in physical activity interventions?

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The focus with this approach is to make small changes rather than to meet specific minimum thresholds



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