A pragmatic randomised controlled trial to evaluate the cost-effectiveness of a physical activity intervention as a treatment for depression: the treating depression with physical activity (TREAD) trial

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Executive summary

Health Technology Assessment 2012; Vol. 16: No. 10
DOI: 10.3310/hta16100

Health Technology Assessment
NIHR HTA programme
www.hta.ac.uk

Executive summary

Background

Depression is a common and disabling condition that is often treated with antidepressant medication in UK primary care. There is interest in non-pharmacological treatments for depression. Currently, counselling and cognitive behavioural therapy are used, although access is often limited.

There is increasing interest in the possibility that physical activity could lead to an improvement in symptomatic outcome in people with depression. An existing systematic review has indicated that, on average, there is a large treatment effect in the existing randomised trials of physical activity in depression. However, there are some limitations in the methodology used and many of the studies are small and have recruited from non-clinical populations.

If physical activity is to be a useful intervention, it is also important to consider the nature of the intervention to be used. Many of the previous studies have not developed a pragmatic intervention that could be used in primary care. We chose to develop a new physical activity intervention delivered by a physical activity facilitator (PAF). The principles behind the intervention were to provide choice and encourage autonomy in order to incorporate the physical activity as a routine part of the participant's life and to help to sustain any increase in physical activity beyond the duration of the intervention.

The TREAting Depression with physical activity (TREAD) study was designed to address a pragmatic question concerned with the effectiveness of our physical activity intervention as a treatment for depression. We wished to examine the intervention as an adjunct to usual care that could include antidepressant medication or a psychological treatment. We intended that our physical activity intervention would be less costly and time-consuming than other psychotherapies such as cognitive behavioural therapy.

Objective

The overall objective of the project was to evaluate the cost-effectiveness of a physical activity intervention as an addition to usual care as a treatment for depression. The first step was to develop a physical activity intervention designed to increase physical activity levels in people with depression. We then conducted a randomised controlled trial in which the physical activity intervention in addition to usual care was compared with usual care alone. We included a nested qualitative study to explore patients' and general practitioners' (GPs')expectations and experiences of physical activity and the physical activity intervention, with the particular aims of understanding:

- participants' and GPs' beliefs and attitudes to physical activity as a treatment for depression
- the acceptability and experience of the physical activity intervention
- how being in the usual care arm affected behaviour.

Methods

We carried out an individually randomised, multicentre trial in which we compared physical activity in addition to usual care with usual care. The randomisation ratio was 1 : 1. The randomisation was carried out with a remote automated telephone system and was stratified by antidepressant use and minimised by centre, severity of symptoms and level of physical activity at baseline.

Participants were recruited from primary care in the Bristol and Exeter areas either by referral from GPs or by identifying likely individuals from the practice database and then inviting them with a letter sent by the GP.

The inclusion criteria were age 18–69 years, with a diagnosis of depression according to the *International Classification of Diseases and Related Health Problems,* 10th Edition (ICD-10), a score of ≥ 14 on the Beck Depression Inventory (BDI), not taking antidepressants at the time of assessment or had been prescribed antidepressants within 4 weeks of assessment but had had an antidepressant-free period of 4 weeks prior to that, able to complete self-administered questionnaires in English and no medical contraindications to physical activity. Exclusions were psychosis, bipolar disorder, serious substance abuse and if pregnant or breastfeeding.

The primary outcome was the BDI at 4 months post randomisation and further follow-ups were conducted at 8 and 12 months. Secondary outcomes included use of antidepressants, level of physical activity and quality of life. Resource-use data were collected from GP records and by self-report at the follow-up points.

A subset of participants was asked to wear an accelerometer after the 4-month follow-up point in order to compare the results of an objective measure of activity with the self-reported information they provided.

Some participants were also asked to contribute to in-depth interviews that were transcribed so that themes could be identified and then coded and analysed using the framework method.

The physical activity intervention was designed to encourage autonomy and provide choice for the participants. A trained PAF met the participants on up to three occasions for face-to-face sessions and had telephone contact for up to a further 10 sessions. The intervention was designed to last about 6–8 months. A written manual was prepared for the PAFs.

Results

Sixty-five practices agreed to take part in the study and baseline assessments were performed on 490 subjects; a total of 361 participants were randomised from the 65 practices with 80% follow-up at 4 months, 61% at 8 months and 71% at 12 months.

At baseline, 182 were randomised to the intervention and 179 to the usual care arm. The two randomised groups were very comparable at baseline. Adherence to the physical activity intervention was good: > 95% attended at least one session, whereas about 70% received at least five sessions including a face-to-face meeting.

The primary analysis indicated that there was no evidence that the intervention group had a better outcome than the usual care group, although the intervention arm did score very slightly lower on the BDI [–0.54, 95% confidence interval (CI) –3.06 to 1.99]. We also examined whether or not there was any evidence of clinical benefit over the duration of the study using a repeated measures linear regression and this had the same conclusion (BDI score –1.20, 95% CI –3.4 to 1.02). There was no evidence that the intervention influenced the use or prescription of antidepressants or quality of life measures.

There was evidence that the physical activity intervention led to an increase in physical activity in the participants. Repeated measures analysis results (odds ratio for a higher level of physical activity 2.27, 95% CI 1.32 to 3.89, $p = 0.003$) indicated that the increase in physical activity was present at all follow-up points and there was evidence that the increase in physical activity was still present at 12 months post randomisation, after the intervention had ended in the majority of participants. There was also evidence that the intervention led to a change in expectations of physical activity.

There was a correlation between the accelerometer results and the self-reported physical activity recall diary used in the study. However, there were also marked differences in rates of light physical activity, probably resulting from the different criteria used by the two methods.

The qualitative interviews with patients indicated that the intervention was seen as highly acceptable and encouraging of physical activity. Some participants attributed improvement to an increase in physical activity but also reported that other factors had been important as well.

On average the intervention cost approximately £220 per person. The costs incurred by the intervention group were greater than those receiving usual care mostly because of the cost of the intervention. As a result, it is very unlikely that the intervention is cost-effective at current willingness-to-pay thresholds.

Conclusions

Implications for health care

- We can be confident in concluding that our physical activity intervention does not benefit outcome in depressive illness when used as an adjunct to usual care and it is very unlikely to be a cost-effective intervention. Therefore, we think it unlikely that advising patients with depression will improve their outcome.
- The TREAD physical activity intervention did increase physical activity, an effect that lasted beyond the duration of the intervention. Our approach was patient centred, putting emphasis on choice and autonomy. It relied not simply upon giving advice or instruction but upon a range of behaviour change techniques. These might well offer GPs and other health professionals different methods of helping patients to increase activity when indicated.

Future research implications

- Future research would be useful if it were to identify and explain mechanisms by which physical activity might affect mood in healthy volunteers. We have referred to evidence about the improvement in mood after vigorous activity and further understanding of the mechanisms would be of value.

- It is possible that only vigorous physical activity leads to benefit in depression. Further smaller scale 'proof of concept' or experimental medicine studies might be able to investigate the optimal type, intensity and duration of physical activity that might be required to produce a therapeutic effect. The effect on mood at different severities of depression could also be investigated using such methods.
- The TREAD physical activity intervention successfully increased physical activity in people with depression, a population in which a number of factors would have been expected to make this task more difficult. It would be useful to examine the cost-effectiveness of the intervention in other areas of medicine where an increase in physical activity might be beneficial, for example obesity and cardiovascular disease.

Trial registration

This trial is registered as ISRCTN16900744.

Funding

Funding for this study was provided by the Health Technology Assessment programme of the National Institute for Health Research.

Publication

Chalder M, Wiles NJ, Campbell J, Hollinghurst SP, Searle A, Haase AM, *et al*. A pragmatic randomised controlled trial to evaluate the cost-effectiveness of a physical activity intervention as a treatment for depression: the treating depression with physical activity (TREAD) trial. *Health Technol Assess* 2012;**16**(10).

NIHR Health Technology Assessment programme

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ISSN 1366-5278 (Print)

ISSN 2046-4924 (Online)

ISSN 2046-4932 (DVD)

Published by Prepress Projects Ltd, Perth, Scotland (www.prepress-projects.co.uk), on behalf of NETSCC, HTA.

Printed on acid-free paper in the UK by the Charlesworth Group.