

# Behavioural activation therapy for post-stroke depression: the BEADS feasibility RCT

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## Scientific summary

### **The BEADS feasibility RCT**

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# Scientific summary

## Background

About one-third of people become depressed after stroke. It is important that depression is treated as it can negatively effect recovery, quality of life and carer strain. There is currently insufficient evidence for the clinical effectiveness and cost-effectiveness of psychological therapies for post-stroke depression. One-third of stroke survivors have aphasia and up to 75% of stroke survivors have problems with memory, thinking or understanding (cognitive problems). People with communication or cognitive problems are often excluded from studies evaluating psychological interventions. We wanted to evaluate a psychological intervention that can be delivered to the wide range of stroke survivors.

Behavioural activation (BA) therapy may be an appropriate treatment for post-stroke depression. BA aims to improve mood by increasing the time people spend doing activities that they enjoy. Importantly, it can be used with stroke survivors with depression, including those with communication or cognitive difficulties. We previously completed a randomised controlled trial (RCT) with 105 stroke survivors with aphasia and low mood and found that those who received BA had improved mood 6 months later. However, this previous study included only people with aphasia, did not explore participants' and carers' views on the intervention and did not evaluate whether or not BA was cost-effective. Therefore, we conducted a feasibility study of BA with stroke survivors with depression to evaluate whether or not it would be possible to proceed to a definitive multicentre trial and, if so, how we could do this. The Behavioural Activation Therapy for Depression after Stroke (BEADS) trial was funded in response to a National Institute for Health Research (NIHR)-commissioned call.

## Objectives

To evaluate the feasibility of undertaking a definitive trial to evaluate the clinical effectiveness and cost-effectiveness of BA compared with usual stroke care for treating people with post-stroke depression.

The primary objective was to determine the feasibility of proceeding to a definitive trial. The secondary objective was to determine the feasibility of delivering BA to people with post-stroke depression.

## Design

The BEADS trial was a parallel-group, feasibility, multicentre RCT with nested qualitative research and economic evaluation. Randomisation was web based and stratified by centre using a computer-generated, pseudo-random list with random permuted blocks of varying sizes. The researcher completing the outcome assessments was blinded to allocation.

## Setting

Recruitment was from acute and community stroke services in three sites in England. The intervention was delivered on an individual basis in participants' homes.

## Participants

Participants were adults (aged  $\geq 18$  years) between 3 months and 5 years post stroke, living in community settings (including nursing homes) and identified as depressed, defined as scoring  $\geq 10$  points on the Patient Health Questionnaire-9 (PHQ-9) or  $\geq 50/100$  points on the Visual Analogue Mood Scales (VAMS) 'Sad' item. People were excluded if they had a visual or hearing impairment that would have an impact on their capacity to take part in the intervention, had a diagnosis of dementia prior to stroke, were unable to communicate in English, had communication difficulties that would have had an impact on their ability to take part in the intervention, did not have capacity to consent, were receiving medical or psychological treatment for depression at the time of stroke onset or were currently receiving psychological intervention.

## Interventions

Participants were randomised (1 : 1 ratio) to BA therapy or usual stroke care. Those allocated to the intervention could receive a maximum of 15 sessions of BA over 4 months in addition to their usual care. BA was delivered by an assistant psychologist (AP) or psychological well-being practitioner over 4 months. BA aims to increase activity, particularly the frequency of pleasant or enjoyable events, in order to improve mood. A BEADS therapy manual was developed and BA therapy techniques included activity monitoring, activity scheduling and graded tasks. The number of therapy sessions varied depending on the needs of the individual and their progress in therapy. The therapists received training in the intervention and additionally in communicating with stroke patients with cognitive and/or communication difficulties.

The control group (usual care) followed their current care pathway and received all other services routinely available to them as local practice.

## Main outcome measures

### *Feasibility outcomes*

The primary end points were based on:

- feasibility of recruitment to the main trial
- acceptability of the research procedures and measures
- appropriateness of the baseline and outcome measures for assessing impact
- retention of participants at outcome
- potential value of conducting the definitive trial, based on value-of-information analysis.

The secondary end points, related to the feasibility of the BA therapy intervention, were based on:

- acceptability of BA therapy to participants, carers and therapists
- feasibility of delivering the intervention by APs or an Improving Access to Psychological Therapies (IAPT) therapist under supervision of an experienced mental health practitioner
- documentation of 'usual care' using a health-care resource use questionnaire
- treatment fidelity of the BA therapy
- feasibility of delivery of BA therapy within current services and within a definitive trial
- estimation of sample size for a definitive trial.

### *Clinical outcomes*

The primary clinical outcome measure at 6 months after randomisation was the PHQ-9.

Secondary clinical outcome measures at 6 months after randomisation were the Stroke Aphasic Depression Questionnaire – Hospital version (SADQ-H), the Nottingham Leisure Questionnaire (NLQ), the Nottingham Extended Activities of Daily Living (NEADL), the Carer Strain Index (CSI), the EuroQoL-5 Dimensions, five-level version (EQ-5D-5L) (standard version and a version for people with cognitive problems) and the health-care resource use questionnaire. Outcome measures were sent by post for those participants without aphasia; telephone calls and a home visit were offered to those for whom outcomes were not returned by post. Outcomes were completed in person for those with aphasia.

Views on the acceptability of the trial design, procedures and the BA intervention were assessed using semistructured interviews with a subset of participants and carers from each arm, and with all three study therapists. Participants and carers were selected for interview using a purposive, maximum variation sampling strategy. Interviews were audio recorded, transcribed verbatim and analysed using the framework approach.

Fidelity was assessed by describing the content of treatment. Therapists completed a time sampling record form at the end of each session to record the time spent on different components of the therapy. A sample of therapy sessions were also video recorded and coded using a therapy record form.

For the health economic analysis, a value-of-information analysis was completed. Costs and utilities were estimated using the EQ-5D-5L and resource use questionnaires, combined with standard costs and valuation sources.

## Results

### *Feasibility outcomes*

A total of 48 participants were recruited at three centres in 27 centre-months of recruitment; this gave a rate of 1.8 participants recruited per centre per month. Recruitment varied by site. The highest proportions of participants were recruited through hospital databases (42.9%) and outpatients (26.5%).

Participants had a mean age of 65.6 years [standard deviation (SD) 13.6 years] and most participants were men (60.4%). Most participants were between 3 months and 1 year post stroke (62.5%). The mean PHQ-9 score at baseline was 16.8 points (SD 4.7 points).

In total, 25 participants were randomised to receive BA and 23 randomised to the usual-care arm. Those who received BA attended a mean of 8.5 (SD 4.4) therapy sessions (range 0–14). Sessions lasted for a mean of 57 minutes (SD 13 minutes, range 10–125 minutes). Delivery of the intervention was good, with high attendance (90%). The main reasons that sessions were missed were a change in the participant's availability ( $n = 14$ , 61%), illness ( $n = 4$ , 17%) and a change in the therapist's availability ( $n = 3$ , 13%). Two participants (9%) withdrew from treatment.

Outcome assessments were completed by 39 (81%) participants (18 BA, 21 usual care). Most participants (63%) returned the follow-up questionnaire by post and 39% of these received at least one reminder contact to complete the assessment. The 6-month follow-up rate was around 80% in most of the outcome questionnaires.

According to the therapy recording forms, some of the time during sessions was spent covering between-session tasks (18.3%). The second most frequent component was activities (18.1%). This included activity monitoring (6.5%), identifying enjoyable activities (6.0%) and activity scheduling (4.8%), with relatively little time spent on practising skills or tasks (0.8%). The least amount of time was spent on communication and cognitive difficulties (0.8%). The use of graded tasks (2.1%) and problem-solving (3.8%) was relatively infrequent. Ten therapy sessions were video recorded across eight participants. Most components of

the manual that were intended to be delivered were evident in all sessions and the video recordings highlighted aspects not otherwise recorded.

Sixteen participants and 10 carers from the intervention and control arms and all three study therapists were interviewed. BA was found to be acceptable to participants, carers and therapists and those involved were generally positive about their experiences.

Participants felt that the most helpful aspects of therapy were identifying new and meaningful activities, reflection during the sessions, having weekly sessions and having the chance to talk with someone. Some participants who received the therapy suggested that follow-up sessions would help to maintain the gains made. Some control participants also found participation in the study helpful as it provided opportunities to talk about their experiences. However, others were uncertain why they had been randomised to usual care. The outcome measures were generally felt to be appropriate in content and length.

Therapists found the manual and training helpful but also suggested having a summary of each session and an interactive notebook or workbook for participants. The biggest challenge reported was the variation in patient presentation, although the therapy and manual allowed sessions to be tailored to individuals' needs. The therapists reported different experiences of recruiting participants, reflecting local site differences.

### *Clinical outcomes*

The mean PHQ-9 scores at 6 months post randomisation were 10.1 points (SD 6.9 points) and 14.4 points (SD 5.1 points) in the BA and control groups, respectively, a difference of  $-3.8$  points [95% confidence interval (CI)  $-6.9$  to  $-0.6$  points] after adjusting for baseline and centre, representing a reduction in depression in the BA arm.

On the secondary outcomes, the intervention had a positive effect for participants on VAMS Sad and the NLQ and for carers on the CSI, although these differences were only small. There was no difference between intervention and control groups on the NEADL. Small negative effects were found for the patient-reported EQ-5D-5L and SADQ-H.

Value-of-information analysis indicated that the benefits of conducting a definitive trial would be likely to outweigh the costs owing to high levels of uncertainty around key parameters such as resource use, response rates, utility scores and relapse rates within the economic model. Our preliminary analysis of the cost-effectiveness of the intervention demonstrates the feasibility of conducting a definitive economic evaluation alongside a definite trial. Our preliminary analysis suggests that the intervention may represent a dominant treatment strategy (i.e. cost saving and quality-adjusted life-years gain) from a societal perspective, but which may be of borderline cost-effectiveness from a NHS and Personal Social Services (PSS) perspective.

We calculated a sample size for a definitive scale trial comparing BA with usual care in participants with post-stroke depression. The primary end point used was PHQ-9 score at 6 months post randomisation. We assumed that a target difference in PHQ-9 scores of between 3 and 5 points would be clinically and practically important and a conservative estimate of SD between 7 and 11 points, giving a range of standardised effect sizes of between 0.27 and 0.71. From this feasibility study, data were used to calculate the intra-cluster correlation coefficient of 0.06 in the intervention arm based on clustering by site. The attrition rate of 18.8% was rounded up to 20% and used to adjust the final sample size calculation. A sample size of 580 participants would be required to detect a difference of 4 points on the PHQ-9 scale with 90% power and 5% significance. This would take approximately 24 months of recruitment in 16 sites assuming a rate of 1.5 participants per site per month, which is similar to the rate observed in the feasibility study (recruitment rate of 1.8 participants per site per month). A sample size of 623 participants would be required to detect a difference of 3 points on the PHQ-9 scale with 90% power and 5% significance.

## Conclusions

Feasibility was demonstrated across the majority of the selected outcomes and strategies for improvements were identified. Depression seemed to improve in the group that received BA. It was feasible to deliver BA to people with and without aphasia or with cognitive impairment, and the therapy was acceptable to participants, carers and therapists. As the study was not powered for efficacy, it is not appropriate to draw conclusions on the value of BA for treating post-stroke depression. Similarly, although cost-effectiveness results are preliminary, value-of-information analysis suggests that conducting a definitive trial would represent good value for money.

Both methods of checking the fidelity of the intervention were feasible. Both highlighted potential ways that therapy deviated from the treatment described in the manual. However, the records kept by therapists were simpler to use and more complete.

The distribution of time on the different components of therapy was as expected. However, there was little documentation of graded tasks assignments and training in problem-solving. This may be because graded tasks were often used as a between-session task and so were coded as such.

The main issue outstanding is whether or not there are sufficient sites willing and able to deliver the services needed to sustain recruitment for a definitive trial.

If a definitive trial were to be undertaken, based on the findings from the BEADS trial, our recommendations are:

- recruit through stroke services rather than using IAPT as a main site for recruitment
- provide at-site support or central monitoring of recruitment
- hold regular teleconferences for the site staff and principal investigators to improve engagement and recruitment
- send out regular newsletters to participants informing them of the study's progress to improve engagement in the study and increase retention
- amend the therapy record form so that the content of the between-session task is recorded
- ensure that study staff and Clinical Research Network staff resourcing is allocated accordingly for the most effective recruitment routes
- explore general practitioner databases and social media as other sources to recruit participants
- ensure that data on NHS, PSS and societal costs are captured
- ensure that sufficient data are collected to allow estimation of a relapse rate
- improve the collection of usual-care data
- consider including a booster session(s) to support maintenance of therapy gains
- consider providing a Quick Reference Guide for the therapists to use alongside the full treatment manual
- develop a fidelity checklist to be used to inform the training of therapists and the monitoring of the videos of therapy sessions during the trial.

## Trial registration

This trial is registered as ISRCTN12715175.

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