Acceptance Based Telephone Support around the time of Transition to Secondary Progressive Multiple Sclerosis: A Feasibility Randomised Controlled Trial

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Highlights

- Many need emotional support after diagnosis of secondary progressive multiple sclerosis
- An ACT-based telephone supported bibliotherapy trial contained acceptable procedures
- Recruitment was not feasible, and 12-months is required to achieve the sample
- Signal of efficacy was not demonstrated in this small sample
- Future trials could use successful elements to achieve low attrition

Abstract

Introduction: Transitioning to secondary progressive multiple sclerosis (SPMS) is a difficult time for people, fraught with psychological uncertainty and an increase in physical disability. In parallel, healthcare appointments become less frequent, most disease modifying treatments are withdrawn, and social contacts typically become more difficult to maintain. The aim of this study was to assess whether providing a brief, Acceptance and Commitment Therapy (ACT)–based telephone support intervention during transition to SPMS is feasible, effective and valued by participants.

Method: A single centre, mixed-methods, two-arm feasibility randomised controlled trial (RCT), comparing (i) ACT-based support + treatment as usual to (ii) treatment as usual only was conducted for those who had transitioned to SPMS. Feasibility, signal of efficacy and acceptability were assessed in both groups by self-report measures at 3 timepoints (baseline, 8 weeks, 12 weeks), and feedback interviews analysed using framework analysis following the completion of the study.

Results: The recruitment strategy was not feasible: 14 of 40 were recruited (35%) during the four-month time period (M^{age} = 53, 10 women). The data collection procedures and trial processes were feasible and acceptable to participants, reflected through all measures being completed, no attrition, and positive participant interview feedback. The intervention did not demonstrate a signal of efficacy between baseline and 8-week or 12-week follow up on measures, but wide confidence intervals preclude drawing strong conclusions. Positive interview feedback suggested outcomes not being captured through self-report measures.

Discussion: Due to an unsuccessful recruitment strategy and mixed evidence of efficacy, certain adjustments should be made to the intervention and methodology before progressing to a definitive trial. A more efficient recruitment strategy, or longer recruitment period is needed to recruit a large enough sample. Adapting the ACT intervention may be needed to ensure that it targets psychological flexibility, which could include changing the workbook or session delivery based on interview feedback, however the small sample size means we should interpret the efficacy findings with caution.

Keywords: multiple sclerosis, telephone therapy, acceptance and commitment therapy, bibliotherapy, feasibility randomised controlled trial

Acceptance Based Telephone Support around the time of Transition to Secondary Progressive Multiple Sclerosis: A Feasibility Randomised Controlled Trial

Multiple sclerosis (MS) is the most common inflammatory neurological disease in young adults, with a worldwide prevalence of approximately 2.8 million (The Multiple Sclerosis International Federation, 2020). Symptoms of MS can be physical (e.g., numbness, weakness, visual impairment), and also psychological (e.g., fatigue, depression) (Calabresi, 2004). For the majority, it presents initially as a series of relapses followed by a period of recovery (McKay et al., 2015). When there is a lack of disease progression between these relapses, this is referred to as relapsing-remitting multiple sclerosis (RRMS).

Approximately 50% of those with RRMS develop a progressive disorder with an absence of relapse then recovery, but more typically a gradual decline in function by 15 years post onset (Scalfari et al., 2014). This is secondary progressive multiple sclerosis (SPMS), and is defined by progressive accumulation of disability after an initial RRMS course; which may or may not contain sharp episodes of decline during progression (Lublin et al., 2014). A gradual worsening of symptoms accompanies greater negative impact on quality of life, and a reduction in work, leisure activities and social relationships (Ziemssen et al., 2020). People often need to accept reliance on physical aids, such as canes and wheelchairs for difficulties with walking and balance (Gross & Watson, 2017). They also may require carers for assistance with a range of symptoms including fatigue and pain, and functional assistance (Davies et al., 2015). SPMS has a high personal cost: those with MS already experience a higher prevalence of clinical depression and anxiety than the general population (Boeschoten et al., 2017), with progressive forms most severely affected (Jones et al., 2012). SPMS also carries a large societal impact because of a frequent inability to work and healthcare costs, which increases in tandem with disease severity (Kobelt et al., 2017).

The progression from RRMS to SPMS usually takes around 20 years from initial diagnosis (Koch et al., 2010; Manouchehrinia et al., 2016). However, identifying progression objectively presents a significant clinical challenge for health professionals. Subsequently, receiving a new diagnosis can take an average of almost three years after onset of progressive symptoms (Katz Sand et al., 2014). From a psychosocial perspective, this can be a time of great distress for the patient (Janssens et al., 2003), fraught with uncertainty (Edwards et al., 2008; Wilkinson & das Nair, 2013), and mirroring the experience of receiving their initial RRMS diagnosis (Deibel et al., 2013). This period has been described as a “fear point” of MS (Davies et al., 2015, p. 8) and a “devastating and demoralising” experience (Thorne et al., 2004, p. 18).

Understanding the needs of people around the point of transition to SPMS is important in designing appropriate interventions. A meta-synthesis found that successful adjustment to SPMS depended primarily on individuals’ coping strategies, sense of independence, and healthcare and social support systems. Those with SPMS who are able to accept or adjust to their diagnosis and disease progression, tended to fare better than those who ignored their increasing difficulties, or restricted and reduced their lives too readily (Meek et al., 2020). Healthy coping strategies and perceived social support in MS adjustment are key (Bassi et al., 2019), and a clear plan to maintain these during transition is needed (Giovannetti et al., 2020). These studies on MS adjustment mirror a unified working model of adjustment to chronic illness as disrupting a person’s *emotional equilibrium* (Moss-Morris, 2013). Successful adjustment necessitates a return to equilibrium (e.g., through acceptance, self-efficacy, problem-focused coping, maintenance of activity), whereas difficult adjustment is characterised by ongoing disequilibrium (e.g., through denial, helplessness, coping through avoidance, reduction in activity).

Despite the needs of those with SPMS and the stressors of transition (Malcomson et al., 2008), input from healthcare providers reduces in SPMS. Those with SPMS are given fewer neurology appointments and feel downgraded from when they had RRMS (Croft et al., 2016), which can be experienced as frustrating and abandoning (Davies et al., 2015). This may be due to the few available effective medications and treatment options (Metz & Liu, 2018). Psychosocial resources to help with the significant emotional response of SPMS transition are recognised as a current deficit in UK NHS services. A key finding from the MS Trust (Croft et al., 2016) is that there is a shortage of psychological services for people with SPMS, with 45% of MS specialists reporting that current psychological services are insufficient in their area (Mynors et al., 2016). Access to mental health specialists is similarly insufficient in the US (Chiu et al., 2018).

Psychological interventions have benefitted people with MS at different points of the disease progression. For example, there is evidence that Cognitive Behavioural Therapy (CBT) approaches may help with depression (Mohr et al., 2001), fatigue (van den Akker et al., 2016) and short-term distress around the initial MS diagnosis (Moss-Morris et al., 2013). Reduction of distress is a positive outcome, but across chronic illness it is recognised that self-efficacy – a sense of being able to manage (Bishop et al., 2008), along with accepting coping styles and social support - are key determinants of successful adjustment (Bassi et al., 2019; Moss-Morris, 2013).

The focus on targeting a reduction in distress in CBT has been criticised by those who feel the cognitive reappraisal mechanism can invalidate logical distress due to the debilitating nature of the condition. In response, some have evaluated approaches which instead target *psychological flexibility*, the ability to engage in the present moment, avoid being swept along by thoughts, and make decisions which are in line with the person's values. Psychological flexibility is a fundamental aspect of health (Kashdan & Rottenberg, 2010) which has been found to account for a large variance in health status (24%) in similar conditions such as chronic pain (McCracken & Velleman, 2010) and underpins the psychological approach of Acceptance and Commitment Therapy (ACT) (Hayes et al., 2012).

ACT is an acceptance-based psychological therapy, which attributes distress to the result of experiential avoidance (i.e., attempts to avoid uncomfortable thoughts and feelings) and psychological inflexibility (i.e., rigid attempts to control psychological reactions). The ACT model advocates accepting thoughts as they are and taking action in ways which follow an individual's values (i.e., directions which give a person meaning) to live a fulfilling and meaningful life (Hayes et al., 2012). This focus on acceptance over reappraisal seems promising when considering the benefits of this style of coping in MS adjustment literature (Meek et al., 2020; Topcu et al., 2020),

A meta-review of 20 meta-analyses found that ACT has greater efficacy than treatment as usual and most active treatments (apart from CBT, where there was little statistical difference) on a range of mental and physical health outcomes including anxiety, depression, and pain (Gloster et al., 2020). ACT tends to demonstrate greater effectiveness in conditions which are chronic and share symptoms with SPMS. The use of ACT in chronic conditions may outperform CBT when people are older (Wetherell et al., 2016) and the average age of onset for SPMS is around 54 (Koch et al., 2010). Until now, ACT has not been used in an SPMS population.

Providing psychological therapy to those with MS has challenges. Psychological support provision is often unavailable from UK NHS neurology services, as staff lack the skills, time and resources to deliver it (Davies et al., 2016). Any trial of psychological therapy in this population would need to have the potential for future application, and an effective low resource intervention would be most suitable. One option could involve running ACT groups (e.g. Brassington et al., 2016; Nordin &

Rorsman, 2012), where a number of people could be seen at once, thus reducing appointment pressures. However, this has challenges of its own. Several ACT trained staff would be required to run the group, and people would need to regularly attend the clinic, which may discourage those who have difficulty with balance (88.6%) or with incontinence (67.6%) (Gross & Watson, 2017). Although at no greater risk to contracting COVID-19 than the general population (Evangelou et al., 2020), uptake for such face-to-face group sessions may be low during the COVID-19 era.

An alternative would be to use telephone appointments, delivered in combination with an ACT bibliotherapy resource (i.e., self-help text). A recent review recommended the use of ACT self-help as an intervention, especially when combined with clinician guidance (French et al., 2017). ACT bibliotherapy has shown promise in a case-series evaluation of those with MS (Harrison et al., 2017) and a robust trial in chronic pain (Veillette et al., 2019). A review examining the efficacy of psychotherapy delivered over the telephone in MS showed moderate benefits in physical and mental health domains, with the authors recommending further studies of better quality (Proctor, Moghaddam, Vogt, et al., 2018).

The potential of an ACT-based telephone supported bibliotherapy is recognised in chronic conditions, and preliminary trials have been conducted in MS (Proctor, Moghaddam, Evangelou, et al., 2018). However, limitations such as small samples and poor adherence mean the evidence base for ACT-based telephone supported bibliotherapy is limited. Some authors have created their own workbooks and materials (Brassington et al., 2016; Ford, 2017), whereas others have used existing ACT specific texts (Hayes, 2005).

ACT is it is presented as a 'transdiagnostic' model (Hofmann & Hayes, 2018); in theory the guiding principles can be applied to a range of conditions. However, this has not translated into bibliotherapy resources, and there is some evidence that non-specific resources, if deemed confusing or complex, can lead to higher attrition rates and lower compliance (Proctor, Moghaddam, Evangelou, et al., 2018). The level of input from the therapist is also important, with bibliotherapy and support calls, found more effective than bibliotherapy on its own (French et al., 2017; Potter et al., 2020).

Given the advances in the literature, albeit with uncertainties of the uptake and practicalities of delivering ACT-based bibliotherapy with the SPMS populations, and in line with the UK Medical Research Council's framework for the development and evaluation of complex interventions (Craig et al., 2013), we felt that a feasibility study was warranted.

The overall aim of this project, therefore, was to assess the feasibility of conducting a definitive randomised controlled trial (RCT) of an ACT-based telephone supported bibliotherapy intervention with people with SPMS who experienced difficulties following their transition from RRMS. The specific aims of the trial were to determine the feasibility of:

1: recruitment capability and resulting sample characteristics
2: data collection procedures and measures
3: acceptability and suitability of intervention and study procedures
4: ability to manage and implement the study and intervention.

Additionally, we wanted to determine whether there was a signal of efficacy of the intervention.

Method

The trial protocol was prospectively registered on ClinicalTrials.gov (ID: NCT04239664). We followed the CONSORT checklist for reporting trials (Schulz et al., 2010).

Design

The trial was a single centre, mixed methods feasibility RCT with two-arms, with participants assigned to: (1) acceptance-based support + treatment as usual (intervention group) or (2) treatment as usual alone (control group). Participants were assessed at baseline, and again at 8- and 12-weeks post-randomisation. Selected participants were invited to complete feedback interviews.

Participants

We aimed to recruit 20 participants per arm (40 in total) to allow for expected attrition and produce an estimated sample size for a future trial, as sample sizes between 12–25 per arm have been recommended (Julious, 2005; Sim & Lewis, 2012). Four from each group (eight total) were invited to participate in feedback interviews. Participants were recruited from an outpatient MS clinic at an NHS Trust in the UK, or through self-referral in response to an advertisement placed on an SPMS-specific Facebook group. The MS clinic had approximately 450 SPMS and 4400 MS patients registered. The age of onset for MS was typically 20-40, with SPMS onset occurring later (50% >60, 36% 50-59, 11% 40-49, 3% <40).

Inclusion Criteria.

We included those who:

- had received a diagnosis of SPMS according to the McDonald criteria (Thompson et al., 2018) in the last 12 months
- were able and willing to consent to the trial
- were 18 years or older
- had a score greater than seven on either component of the Hospital Anxiety and Depression Scale (HADS)
- were able to communicate in English

Exclusion Criteria.

We excluded those who:

- were currently receiving any psychological or cognitive or mental health intervention, or had done so in the previous six months
- had a serious co-morbid physical health diagnosis at screening (e.g., dementia, cancer)
- were participating in another interventional study.

Measures

We used the HADS as a measure of anxiety and depression (Zigmond & Snaith, 1983), because it has been validated for use in MS and both subscales have high sensitivity and specificity (Honarmand & Feinstein, 2009). The Francis et al. (2016) Comprehensive Assessment of Acceptance and Commitment Therapy processes (CompACT) was used to measure psychological flexibility, because it has excellent internal consistency and test-retest reliability (Bayliss, 2018), and a greater discriminant validity than other similar measures (Ong et al., 2020). To measure impact on MS specific symptoms, we used the Hobart et al. (2001) Multiple Sclerosis Impact Scale (MSIS-29), because its reliability has been demonstrated across community and hospital settings and it has excellent internal consistency (Jones et al., 2013). Self-efficacy was measured using the Rigby et al. (2003) Multiple Sclerosis Self-Efficacy scale (MSSE), which has good internal consistency and test-retest reliability. Quality of life was measured through the visual analogue scale of the EuroQol Quality of Life (EQ-5D-5L), which is a widely used and reliable measure for use in MS (Kuspinar & Mayo, 2014) (Table 1).

[Insert Table 1]

Procedure

Potential participants from the MS clinic were informed about the study by their neurologist or nurse specialist and with consent, their contact details were passed to the Lead Researcher (CM). The Lead Researcher telephoned them to confirm their willingness to participate. Eligible participants from the SPMS-specific Facebook group self-referred by telephoning the Lead Researcher. Potential participants from both recruitment routes were screened initially for eligibility over the telephone based on the inclusion and exclusion criteria. If eligible, a participant information sheet and a consent form were posted to the participant, and they were telephoned a week afterwards to answer any questions and explain the next steps.

Following completion of the consenting process, demographic and MS-specific data were collected from the MS service. Baseline self-report measures were taken using standardised assessment questionnaires to assess depression, anxiety, impact of MS, self-efficacy, quality of life, and psychological flexibility. Participants were sent identical measures at baseline (T^0), eight weeks (T^1) and 12-weeks (T^2) post randomisation. Measures were completed by post or using JISC online survey software (dependent on participant preference). Telephone support was provided if participants had difficulty completing the self-report measures. No changes were made to measures during the trial.

Randomisation was completed by the Lead Researcher using an online randomisation service and randomly sized permeated blocks to each arm (ratio: 1:1). Following randomisation, a face-to-face session was arranged for all participants individually with the Lead Researcher at their home. This was to inform participants of the group they were randomised to, to collect consent forms, and distribute workbooks to those in the intervention group. No blinding was used as participants were aware if they were receiving psychological therapy input, as this was not part of treatment as usual. The Lead Researcher was not blinded to participant group as they were also the therapist.

Once participants completed the trial, a sample were invited to consent to a recorded semi-structured feedback interview about their experience. The first participants to complete the study were selected until four participants had been invited from each study arm. These interviews were delivered by a trainee clinical psychologist not involved in the intervention delivery (LLO) using an interview schedule, adapted based on the client change interview (Elliott et al., 2001). Throughout the study participants were sent reminders to complete outcome measures following recommendations from Weston et al. (2017). Reminders were sent as text messages in order to improve response rates. A text message was sent the day measures were posted to participants, and when they had been received back by the researcher (and a prompt after 7 working days if they had not been received) as part of the mailing process.

Intervention

Acceptance Based Support (ABS) was a weekly six-session individually delivered ACT-based telephone supported bibliotherapy intervention with a trainee clinical psychologist (the Lead Researcher) for those transitioning to SPMS. The Lead Researcher had two years of experience delivering ACT in face-to-face settings, under supervision from qualified clinical psychologists. The first session was face-to-face, with the subsequent five sessions completed via telephone whilst the participant was at home. All sessions were 30 minutes in length. In the first session, participants were given a 49-page SPMS-specific workbook adapted with permission for this study from Ford (2017) and Brassington et al. (2016), and they used this during and between sessions. In telephone sessions, participants would receive psychological support which followed an ACT approach, with the workbook also consistent with the ACT model. The purpose of the support and the workbook was to increase psychological flexibility and wellbeing.

The workbook contained three ordered sections: familiarisation, mindfulness, and values. Through the telephone sessions the Lead Researcher assisted the participant to apply the ACT model to their own lives and helped them navigate the workbook with weekly homework. The progression through the workbook was adapted to each participant's needs.

The control group received a face-to-face appointment with the Lead Researcher but no telephone calls. In both arms, treatment as usual referred to the typical contact those recently diagnosed with SPMS received from the neurology service, which followed standard UK National Institute for Health and Care Excellence (NICE) guidelines for management of MS (NICE, 2014).

Analysis

The analysis of this feasibility study was structured using the Orsmond and Cohn (2015) framework (Table 2). The main aim was to assess aspects related to feasibility, not statistical significance or power (Tickle-Degnen, 2013). However, statistical analyses were used to calculate effect sizes and explore confidence intervals to determine the sample size for a future study and a signal of efficacy. Individual differences were measured using the Reliable Change Index (RCI) and Clinically Significant Change (CSC) (Evans et al., 1998), from norms developed for the CompACT (Bayliss, 2018) and HADS (Honarmand & Feinstein, 2009; Marrie et al., 2018).

Framework analysis (Ritchie et al., 2003) was used to analyse the feedback interviews, following the stages recommended by Gale et al. (2013). Care was taken to mitigate for bias through double-coding and oversight of the analysis by members of the research team. Transcription, familiarisation and coding (stages 1-3) were completed by a second researcher along with the Lead Researcher, with each transcript double-coded and then combined through mutual agreement into one master set of codes. Developing and applying the framework (stages 4-5) onwards were completed solely by the Lead Researcher. Pre-defined categories based on Orsmond and Cohn (2015) were used to create the framework matrix (stage 6). The codes placed into these categories emerged inductively from the interview data. Relevant codes were assigned to these categories to build the framework, and irrelevant codes which did not fit into any category were discarded.

[Insert Table 2]

Fidelity

The fidelity of the intervention was assessed against published criteria (O'Neill et al., 2019) by a clinical psychologist (NGM) with >10 years of ACT experience.

Ethics

The study was approved by University of Nottingham (ID: 19019) and NHS (ID: 19/NW/0261) Research Ethics Committees. Participants gave informed consent and did not receive any financial compensation for their participation.

Results

1: Recruitment Capability and Resulting Sample Characteristics

Sample.

From the outpatient clinic, consultants referred 28 participants, of whom 13 consented between September and December 2019. Three MS charities were contacted but unable to assist with the recruitment. Two participants responded to a Facebook advertisement placed in September 2019, and one consented, bringing the total number enrolled to 14 (Figure 1). Baseline demographic (Table 3) and clinical characteristics (Table 4) were recorded. Independent samples t-tests were conducted which showed no significant differences between groups on these variables.

[Insert Figure 1]

[Insert Table 3]

[Insert Table 4]

Recruitment.

All participants contacted who were eligible consented to take part. There were a proportion whose eligibility could not be determined (8 of 28, 29%) who did not respond to a first (2 of 8, 25%) or subsequent (6 of 8, 75%) attempt (phone call) to enrol in the study. We recruited participants at a stable rate of 3.5 participants per month over four months.

Relevance of Study to the Population.

Framework analysis (Table 5) highlighted the relevance of the study to participants. Social support in this population is often self-limiting to avoid burdening others and because of perceived societal lack of understanding of MS. Healthcare support, such as General Practitioner (GP) or consultant contact, can also be difficult to access and time limited. Therefore, an outlet to be able to talk to a professional, and the opportunity to help (others with MS, research, and the community) was valued. In general, the study was perceived as an attractive outlet to meet these needs.

[Insert Table 5]

2: Data Collection Procedures and Outcome Measures

Completion Rates and Errors.

At baseline (T^0), eight-week (T^1) and 12-week (T^2) follow-up, all 14 participants (100%) returned their measures between September 2019 and February 2020. The measures were generally well tolerated, with all HADS, MSIS and EQ-5D-5L questionnaires completed (100%), and 41 of 42 (98%) CompACT questionnaires completed (one pack returned unfilled). The MSSE was frequently completed incorrectly, due to an unclear layout, and 31 of 42 (74%) were interpretable. At 8 and 12-week follow-up, one of 14 (7%) and six of 14 participants (43%) received a prompt reminding them to complete their measures, respectively.

Acceptability of Questionnaires and Letter-based Outcome Measures.

Five of six interviewed participants found the postal system acceptable, and the questionnaires straightforward to complete. However, one participant had concerns regarding the text size of the questionnaires; it was too small.

3: Acceptability and Suitability of Intervention and Study Procedures

Attrition.

All participants completed the study.

Face-to-face Meetings and Support Calls.

All participants received one face-to-face meeting, and all in the intervention group received five support calls between September 2019 and February 2020. Of the 14 face-to-face meetings, none were rearranged. Of the 30 support calls, four were rearranged (13%) for the following reasons: too busy (*n* = 3), hospital appointment (*n* = 1). All asked participants agreed to have a support call recorded to assess fidelity. Face-to-face meetings were scheduled for 30 minutes each and followed this time approximately. The average length of support call was 32 minutes (*SD* = 5 minutes). The average length of time a participant took to complete the six-week intervention was 6.65 weeks (range = 5.29-8.14 weeks) (*SD* = 0.96 weeks).

Qualitative Outcomes.

Eight participants were asked to participate in feedback interviews. Six accepted (four in intervention group, two in control group), with an average interview length of 24 minutes (*SD* = 15.15). The intervention group interviews (*M* = 29.85, *SD* = 11.12) were longer than the control group interviews (*M* = 11.12, *SD* = 9.03).

Workbook Readability.

All text of the 49-page workbook was assessed for readability. Based on the readability analysis, the text was deemed 'fairly easy to read', requiring a reading age of 11-13 years.

Accessibility.

Participants found the telephone calls and completing measures convenient, and some preferred being able to receive support over the telephone rather than needing to attend a clinic.

Randomisation.

Randomisation was easy to perform and resulted in even groupings. Participants understood the randomisation process and found it acceptable.

Telephone Sessions and the Workbook.

Telephone sessions were found to be generally acceptable in their structure, but two of four interviewed intervention group participants mentioned they would have preferred longer sessions. The workbook was acceptable and used by participants in the intervention group, however one participant struggled to engage with the homework (Table 6).

[Insert Table 6]

4: Ability to Manage and Implement the Study and Intervention

No adverse events were reported. The study carried a recruitment, therapeutic and administrative burden, and this was managed primarily by the Lead Researcher. One full day per week was dedicated for seven months, from the beginning of recruitment to the final measure collected (approximately 28 eight-hour days [224 hours]).

5: Participant Responses to Intervention

Fidelity.

A sample (7.14%, three telephone calls) of the 42 telephone calls were assessed. All sample calls were judged to be maximally ACT consistent (Total Consistency Score = 36 [on a scale of 0–36], Total Inconsistency Score = 0 [on a scale of 0-36]).

Signal of Efficacy.

Quantitative Outcomes.

None of the pairwise comparisons between groups were statistically significant in this small sample (Table 7). Within groups, no significant effects were found (Table 8).

[Insert Table 7]

[Insert Table 8]

Clinically significant individual level changes in anxiety, depression and psychological flexibility were uncommon; a minority of participants demonstrated reliable change across the clinical threshold in both groups, however the majority made no reliable and clinical change at eight and 12 weeks (Table 9).

[Insert Table 9]

Sample Size Estimation.

Given that depression is a key determinant of quality of life in MS (D'Alisa et al., 2006) the HADS-D score could defensibly form the primary outcome for a definitive trial, and was used for indicative sample size estimation (although the optimal choice of outcome measure is yet to be determined, and should reflect endpoints that are important to patients and logically linkable to effects of intervention). The minimally important difference for the HADS-D has been estimated to be 1.5 points in a chronic disease population (Puhan et al., 2008). Based on *SD*s observed in the current study, a sample size of 242 (121 in each arm) would provide sufficient power (80% at a two-sided alpha of .05) to detect a difference of this magnitude (1.5 points, equivalent to $d = 0.362$) at 8-week follow-up in a definitive two-arm superiority trial. No attrition was observed in the current trial, but caution is advisable when using attrition rates in small-*n* feasibility trials to estimate attrition in a definitive trial: Based on an estimate of average attrition in definitive trials of 16.8% (Cooper et al., 2018), the recruitment target should be adjusted to 292 to account for possible attrition. Considering the monthly recruitment rate in the current study (3.5 participants) at least four recruiting centres would be required to meet this target within a two-year recruitment phase. Recognising the small sample in the current trial (and likely imprecision of *SD* estimation) further (e.g., internal) piloting is recommended to inform sample size calculation for the definitive trial.

Qualitative Outcomes.

The control group reported no changes in mood or quality of life. In the intervention group, two of the participants said their mood had improved, one remained the same, and one felt better initially but got worse later. In terms of quality of life, two participants reported feeling much better, one slightly better, and one initially better, but now worse.

Three of four intervention group participants said they had become more mindful or present, with two mentioning that they were living life according to their values. Two mentioned a values-focussed metaphor from the workbook. Three of four intervention group participants reported change in their coping strategies and mindset. Two spoke about having a more positive and values-based mindset. All participants described the intervention in positive terms as beneficial, with one participant describing it as a “lifeline”, and another stating that the work should be replicated (Table 10).

[Insert Table 10]

Discussion

This is the first study to assess the feasibility of delivering an ACT-based telephone supported bibliotherapy intervention to those transitioning to SPMS. We have used the Avery et al. (2017) traffic light system for pilot trials to structure this discussion: green (go), amber (amend), and red (stop). Based on these criteria, we conclude that certain adjustments to the recruitment strategy and intervention are required before progressing to a definitive trial. Based on the results of efficacy, and the small sample, it would be premature to conclude that the use of the ACT-based telephone supported bibliotherapy is not effective based solely on these self-report measures, but the intervention was not supported by them here. The data collection procedures and acceptability of the intervention (workbook, telephone calls) were successful and we recommend that these elements are retained in future trials of people with SPMS.

ACT-based interventions primarily aim to target psychological flexibility. The intervention group demonstrated a mixed pattern of effect-sizes which did not show clear signal of efficacy in improving psychological flexibility. However, participants in the intervention group spoke positively about the

intervention and the process in broad terms. It may be that the intervention was beneficial in a social sense and they felt supported during the trial but did not demonstrate clinical change. We cannot conclude that an ACT-based intervention is unsuitable in SPMS, as the results would refute the ACT model more if psychological flexibility did change in the absence of corresponding change on other measurements of wellbeing (such as quality of life). However, this intervention may need to be re-evaluated to ensure that psychological flexibility is successfully targeted as mixed results do not fit with the majority of the evidence base for ACT-based bibliotherapy interventions (French et al., 2017) or teletherapy in MS (Proctor, Moghaddam, Vogt, et al., 2018) which successfully target psychological flexibility.

Feasibility

1: Recruitment Capability and Resulting Sample Characteristics.

Rating: Amber.

This intervention was attractive, but the recruitment strategy was not feasible and should be reconsidered for any future trial. The neurology service ran several MS clinics each week, but attending a clinic proved to be an inefficient way of meeting participants (>95% were unsuitable). The Lead Researcher needed to attend the service as neurologists infrequently made referrals when the Lead Researcher was not on the premises. This may have been due to clinicians being busy or competition from other concurrently running research studies.

The two groups' baseline demographic and clinical data were well matched and representative of the wider client group. All participants were White British and may not be representative of other ethnic groups. The sample for the feedback interviews may not have been representative in the control group, as those who provided feedback were both male and showed the least distress on baseline measures.

A future study, using the same methodology in a single (similar sized) UK neurology clinic would achieve an estimated monthly recruitment rate of 3.5 participants. To increase the rate of recruitment, the one year criterion of time since transition could be relaxed instead to three years to allow for the inherent uncertainty around transition, from when SPMS progression is first suspected and discussed (Katz Sand et al., 2014). Furthermore, future studies should consider recruiting from multiple MS clinics concurrently, consider contacting GPs, and should consider using in-person or electronic prompting systems for clinicians when a patient meets trial inclusion criteria to increase referral rates (Embi et al., 2005). Community recruitment, such as through SPMS social media support groups and local charities could be utilised, provided SPMS status can be determined (Simpson et al., 2017). This may have an impact in terms of intervention delivery and more than one therapist would be required.

2: Data Collection Procedures and Measures.

Rating: Green.

Data collection procedures were successful. However, the measure of self-efficacy needs to be displayed more clearly to avoid uninterpretable data. Ensuring that all measures are of an appropriate text size and being responsive to visual needs are additional areas for improvement. Data collection could occur electronically, using online survey software, which would allow participants to adjust the text size on their device. Future studies could also measure the types of assistance (e.g., physical aids) available to participants, as psychological flexibility may conceptually predict acceptance of changing physical needs. In future trials, a measurement of goal-attainment could also be used, as this may meet the individual needs of participants whilst also being congruent with the functional focus of an ACT intervention.

3: Acceptability and Suitability of Intervention and Study Procedures.

Rating: Green.

The suitability of the intervention and procedures were a success, with all participants completing the intervention and, for those that were selected for interview, providing positive interview feedback. Participants understood the workbook contents, and preferred the sessions being over the telephone to attending a clinic. Changes could be made to the length or number of sessions, as some participants wanted a higher intensity of therapy, and optional extra sessions could be offered based on participant need. This would have disadvantages however, as it would mean a greater time burden for the trial and more experienced therapists.

4: Ability to Manage and Implement the Study and Intervention.

Rating: Green.

The study carried a recruitment, therapeutic and administrative burden, managed successfully by the Lead Researcher working one full day a week with no reported adverse events. Recruiting at a higher rate would require an equivalent increase in time resource to avoid the study becoming unmanageable.

5: Participant Responses to Intervention.

Rating: Amber.

A lack of difference in pairwise comparisons between and within groups on measures meant that the efficacy of the intervention has not been demonstrated in this small sample. In addition, on individual level analyses, few participants showed reliable clinical change from baseline. However, the wide confidence intervals and the small sample precludes strong conclusions about the directionality of aggregate effects, and do not rule out the possibility of clinically meaningful improvement.

The intervention group participants, although only a small sample of four, spoke positively about their experience at interview, with specific mentions of improvements in ACT-specific concepts of mindfulness, acceptance, and values. As the interview feedback was not corroborated by improvements in measures, we hypothesised this may have been related to demand characteristics or a small sample. Participants did mention some benefits not captured on the selected measures, such as being able to talk to someone impartial and reliable, or changes in outlook and coping.

A future trial could measure changes in loneliness or coping in self-report measures validated for use in MS populations (e.g. Pakenham, 2001; Russell et al., 1980). Changes to the intervention may be needed to ensure psychological flexibility is targeted before progression to a future trial. Efficacy could also be measured in other ways (e.g., through acceptance of assistance, or activity levels). However, we caution against over-burdening participants, and future studies could be more considerate of the potential cognitive difficulties that people with SPMS may experience. For example, assessment times could be shortened by having fewer assessments, and the intervention could be 'chunked' into smaller units and include other brief engaging forms of media, such as videos.

Strengths and Limitations

Limitations.

The main limitation of this study was the failure of the recruitment strategy which led to a small sample. An assumption was made that we would be able to recruit quickly based on the number of people with SPMS being seen by the clinic. However, locating suitable participants presented a challenge, due to strict recruitment criteria and an inefficient recruitment strategy. A second

limitation is that the intervention failed to demonstrate efficacy, and revisions to the delivery of the intervention may be warranted. Future trials could also consider making use of an active control arm; however this has drawbacks as it does not compare an intervention with current provision (das Nair et al., 2019). Lastly, as the descriptive data were collected and analysed by the Lead Researcher, this may have lent itself to positive researcher bias.

Strengths.

Our use of a mixed methodology allowed both quantitative and qualitative analysis is a strength because we were able to collect rich data to inform the knowledge gaps we had at the start of this trial. The framework analysis component was rigorous, as an individual not involved in intervention delivery, but trained in semi-structured interviewing conducted the interviews independently. This resulted in rich feedback and reduced the likelihood of types of bias such as social desirability bias on the behalf of the participant, confirmation bias and leading questions bias on the part of the researcher. This structure generated criticism on some aspects of the study, which adds credibility to the positive feedback for some other elements.

Further strengths included ensuring there was an assessment for fidelity to the intervention using recorded sessions analysed by a different member of the study team, and analysis of the readability of the self-help material as confusing language has been a criticism of similar ACT workbooks in previous studies (Potter et al., 2020; Proctor, Moghaddam, Evangelou, et al., 2018). No attrition is also a strength.

Conclusions

This study assessed the feasibility of delivering an ACT-based telephone supported bibliotherapy intervention to those transitioning to SPMS. Due to an unsuccessful recruitment strategy and mixed evidence of efficacy, certain adjustments should be made to the intervention and methodology before progressing to a definitive trial. Data collection and trial procedures were successful and acceptable to participants. A more efficient recruitment strategy, or longer recruitment period in multiple sites is needed to recruit a large enough sample. Adapting the intervention may be needed to ensure that it targets ACT-processes, and this could include changing the workbook or delivery of sessions, but we should be cautious of making broad changes based on a small sample.

References

Avery, K. N. L., Williamson, P. R., Gamble, C., Connell Francischetto, E., Metcalfe, C., Davidson, P., Williams, H., & Blazeby, J. M. (2017). Informing efficient randomised controlled trials: Exploration of challenges in developing progression criteria for internal pilot studies. *BMJ Open*, *7*(2), e013537. https://doi.org/10.1136/bmjopen-2016-013537

Bassi, M., Cilia, S., Falautano, M., Grobberio, M., Niccolai, C., Pattini, M., Pietrolongo, E., Quartuccio, M. E., Viterbo, R. G., Allegri, B., Amato, M. P., Benin, M., De Luca, G., Gasperini, C., Minacapelli, E., Patti, F., Trojano, M., & Delle Fave, A. (2019). Illness perceptions and psychological adjustment among persons with multiple sclerosis: The mediating role of coping strategies and social support. *Disability and Rehabilitation*, 1-13. https://doi.org/10.1080/09638288.2019.1610511

Bayliss, K. (2018). *Confirmatory Factor Analysis and further validation of the Comprehensive assessment of Acceptance and Commitment Therapy processes (CompACT)* [Doctoral thesis, University of Nottingham]. Nottingham eTheses. http://eprints.nottingham.ac.uk/id/eprint/53620

Bishop, M., Frain, M. P., & Tschopp, M. K. (2008). Self-management, perceived control, and subjective quality of life in multiple sclerosis: An exploratory study. *Rehabilitation Counseling Bulletin*, *52*(1), 45-56. https://doi.org/10.1177/0034355208320000

Boeschoten, R. E., Braamse, A. M. J., Beekman, A. T. F., Cuijpers, P., van Oppen, P., Dekker, J., & Uitdehaag, B. M. J. (2017). Prevalence of depression and anxiety in multiple sclerosis: A systematic review and meta-analysis. *Journal of the Neurological Sciences*, *372*, 331-341. https://doi.org/10.1016/j.jns.2016.11.067

Brassington, L., Ferreira, N. B., Yates, S., Fearn, J., Lanza, P., Kemp, K., & Gillanders, D. (2016). Better living with illness: A transdiagnostic acceptance and commitment therapy group intervention for chronic physical illness. *Journal of Contextual Behavioral Science*, *5*(4), 208-214. https://doi.org/10.1016/j.jcbs.2016.09.001

Calabresi, P. A. (2004). Diagnosis and management of multiple sclerosis. *American Family Physician*, *70*(10), 1935-1944.

Chiu, C., Bishop, M., McDaniels, B., Kim, B.-J., & Tiro, L. (2018). A Population-Based Investigation of Health-Care Needs and Preferences in American Adults With Multiple Sclerosis. *Journal of Patient Experience*, *7*(1), 34-41. https://doi.org/10.1177/2374373518812078

Cooper, C. L., Whitehead, A., Pottrill, E., Julious, S. A., & Walters, S. J. (2018). Are pilot trials useful for predicting randomisation and attrition rates in definitive studies: A review of publicly funded trials. *Clinical Trials*, *15*(2), 189-196. https://doi.org/10.1177/1740774517752113

Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., & Petticrew, M. (2013). Developing and evaluating complex interventions: The new medical research council guidance. *International Journal of Nursing Studies*, *50*(5), 587-592. https://doi.org/10.1016/j.ijnurstu.2012.09.010

Croft, A., Mynors, G., Roberts, M., Doncaster, D., Bowen, A., & Trust, M. S. (2016). MS forward view: A consensus for the future of MS services. *Multiple Sclerosis Trust*, *9*, S5-S48.

D'Alisa, S., Miscio, G., Baudo, S., Simone, A., Tesio, L., & Mauro, A. (2006). Depression is the main determinant of quality of life in multiple sclerosis: a classification-regression (CART) study. *Disability and Rehabilitation*, *28*(5), 307-314. https://doi.org/10.1080/09638280500191753

das Nair, R., de Groot, V., & Freeman, J. (2019). Beyond current research practice: Methodological considerations in MS rehabilitation research (is designing the perfect rehabilitation trial the Holy Grail or a Gordian knot?). *Multiple Sclerosis Journal*, *25*(10), 1337-1347. https://doi.org/10.1177/1352458519858271

Davies, F., Edwards, A., Brain, K., Edwards, M., Jones, R., Wallbank, R., Robertson, N. P., & Wood, F. (2015). 'You are just left to get on with it': Qualitative study of patient and carer experiences of the transition to secondary progressive multiple sclerosis. *BMJ Open*, *5*(7), e007674. https://doi.org/10.1136/bmjopen-2015-007674

Davies, F., Wood, F., Brain, K. E., Edwards, M., Jones, R., Wallbank, R., Robertson, N. P., & Edwards, A. (2016). The transition to secondary progressive multiple sclerosis. *International Journal of MS Care*, *18*(5), 257-264. https://doi.org/10.7224/1537-2073.2015-062

Deibel, F., Edwards, M., & Edwards, A. (2013). Patients', carers' and providers' experiences and requirements for support in self-management of multiple sclerosis: A qualitative study. *European Journal for Person Centered Healthcare*, *1*(2), 457-467. https://doi.org/10.5750/ejpch.v1i2.687

Edwards, R. G., Barlow, J. H., & Turner, A. P. (2008). Experiences of diagnosis and treatment among people with multiple sclerosis. *Journal of Evaluation in Clinical Practice*, *14*(3), 460-464. https://doi.org/10.1111/j.1365-2753.2007.00902.x

Elliott, R., Slatick, E., & Urman, M. (2001). Qualitative Change Process Research on Psychotherapy: Alternative Strategies. *Psychologische Beitrage*, *43*(3), 69-111.

Embi, P. J., Jain, A., Clark, J., Bizjack, S., Hornung, R., & Harris, C. M. (2005). Effect of a clinical trial alert system on physician participation in trial recruitment. *Archives of internal medicine*, *165*(19), 2272-2277. https://doi.org/10.1001/archinte.165.19.2272

Evangelou, N., Garjani, A., dasNair, R., Hunter, R., Tuite-Dalton, K. A., Craig, E. M., Rodgers, W. J., Coles, A., Dobson, R., Duddy, M., Ford, D. V., Hughes, S., Pearson, O., Middleton, L. A., Rog, D., Tallantyre, E. C., Friede, T., Middleton, R. M., & Nicholas, R. (2020). Self-diagnosed COVID-19 in people with multiple sclerosis: a community-based cohort of the UK MS

Register. *Journal of Neurology, Neurosurgery & Psychiatry*, jnnp-2020-324449. https://doi.org/10.1136/jnnp-2020-324449

Evans, C., Margison, F., & Barkham, M. (1998). The contribution of reliable and clinically significant change methods to evidence-based mental health. *Evidence Based Mental Health*, *1*(3), 70. https://doi.org/10.1136/ebmh.1.3.70

Ford, S. A. (2017). *Delivering Acceptance and Commitment Therapy (ACT) for mental health disorders across group and guided self-help formats: A meta-analysis and randomised controlled trial* [Doctoral thesis, University of Edinburgh]. ERA. http://hdl.handle.net/1842/25924

Francis, A. W., Dawson, D. L., & Golijani-Moghaddam, N. (2016). The development and validation of the Comprehensive assessment of Acceptance and Commitment Therapy processes (CompACT). *Journal of Contextual Behavioral Science*, *5*(3), 134-145. https://doi.org/https://doi.org/10.1016/j.jcbs.2016.05.003

French, K., Golijani-Moghaddam, N., & Schröder, T. (2017). What is the evidence for the efficacy of self-help acceptance and commitment therapy? A systematic review and meta-analysis. *Journal of Contextual Behavioral Science*, *6*(4), 360-374. https://doi.org/j.jcbs.2017.08.002

Gale, N. K., Heath, G., Cameron, E., Rashid, S., & Redwood, S. (2013). Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Medical Research Methodology*, *13*(1), 117. https://doi.org/10.1186/1471-2288-13-117

Giovannetti, A. M., Pietrolongo, E., Borreani, C., Giordano, A., Schiffmann, I., Barabasch, A., Heesen, C., Solari, A., & for the ManTra, P. (2020). Conversion to secondary progressive multiple sclerosis: Multistakeholder experiences and needs in Italy. *PloS one*, *15*(2), e0228587. https://doi.org/10.1371/journal.pone.0228587

Gloster, A. T., Walder, N., Levin, M. E., Twohig, M. P., & Karekla, M. (2020). The empirical status of acceptance and commitment therapy: A review of meta-analyses. *Journal of Contextual Behavioral Science*, *18*, 181-192. https://doi.org/https://doi.org/10.1016/j.jcbs.2020.09.009

Gross, H. J., & Watson, C. (2017). Characteristics, burden of illness, and physical functioning of patients with relapsing-remitting and secondary progressive multiple sclerosis: A cross-sectional US survey. *Neuropsychiatric Disease and Treatment*, *13*, 1349-1357. https://doi.org/10.2147/NDT.S132079

Harrison, A. M., McCracken, L. M., Jones, K., Norton, S., & Moss-Morris, R. (2017). Using mixed methods case-series evaluation in the development of a guided self-management hybrid CBT and ACT intervention for multiple sclerosis pain. *Disability and Rehabilitation*, *39*(18), 1785-1798. https://doi.org/10.1080/09638288.2016.1209580

Hayes, S. C. (2005). *Get out of your mind and into your life: The new acceptance and commitment therapy*. New Harbinger Publications.

Hayes, S. C., Pistorello, J., & Levin, M. E. (2012). Acceptance and commitment therapy as a unified model of behavior change. *The Counseling Psychologist*, *40*(7), 976-1002. https://doi.org/10.1177/0011000012460836

Hobart, J., Lamping, D., Fitzpatrick, R., Riazi, A., & Thompson, A. (2001). The Multiple Sclerosis Impact Scale (MSIS-29): A new patient-based outcome measure. *Brain*, *124*(5), 962-973. https://doi.org/10.1093/brain/124.5.962

Hofmann, S. G., & Hayes, S. C. (2018). The future of intervention science: process-based therapy. *Clinical Psychological Science*, *7*(1), 37-50. https://doi.org/10.1177/2167702618772296

Honarmand, K., & Feinstein, A. (2009). Validation of the Hospital Anxiety and Depression Scale for use with multiple sclerosis patients. *Multiple Sclerosis Journal*, *15*(12), 1518-1524. https://doi.org/10.1177/1352458509347150

Janssens, A. C., van Doorn, P. A., de Boer, J. B., van der Meche, F. G., Passchier, J., & Hintzen, R. Q. (2003). Impact of recently diagnosed multiple sclerosis on quality of life, anxiety, depression and distress of patients and partners. *Acta Neurologica Scandinavica*, *108*(6), 389-395. https://doi.org/10.1034/j.1600-0404.2003.00166.x

Jones, K. H., Ford, D. V., Jones, P. A., John, A., Middleton, R. M., Lockhart-Jones, H., Osborne, L. A., & Noble, J. G. (2012). A large-scale study of anxiety and depression in people with multiple sclerosis: A survey via the web portal of the UK MS Register. *PloS one*, *7*(7), e41910. https://doi.org/10.1371/journal.pone.0041910

Jones, K. H., Ford, D. V., Jones, P. A., John, A., Middleton, R. M., Lockhart-Jones, H., Peng, J., Osborne, L. A., & Noble, J. G. (2013). The physical and psychological impact of multiple sclerosis using the MSIS-29 via the web portal of the UK MS Register. *PloS one*, *8*(1), e55422. https://doi.org/10.1371/journal.pone.0055422

Julious, S. A. (2005). Sample size of 12 per group rule of thumb for a pilot study. *Pharmaceutical Statistics*, *4*(4), 287-291. https://doi.org/10.1002/pst.185

Kashdan, T. B., & Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clinical Psychology Review*, *30*(7), 865-878. https://doi.org/https://doi.org/10.1016/j.cpr.2010.03.001

Katz Sand, I., Krieger, S., Farrell, C., & Miller, A. E. (2014). Diagnostic uncertainty during the transition to secondary progressive multiple sclerosis. *Multiple Sclerosis Journal*, *20*(12), 1654-1657. https://doi.org/10.1177/1352458514521517

Kobelt, G., Thompson, A., Berg, J., Gannedahl, M., & Eriksson, J. (2017). New insights into the burden and costs of multiple sclerosis in Europe. *Multiple Sclerosis Journal*, *23*(8), 1123-1136. https://doi.org/10.1177/1352458517694432

Koch, M., Kingwell, E., Rieckmann, P., & Tremlett, H. (2010). The natural history of secondary progressive multiple sclerosis. *Journal of Neurology, Neurosurgery and Psychiatry*, *81*(9), 1039-1043. https://doi.org/10.1136/jnnp.2010.208173

Kuspinar, A., & Mayo, N. E. (2014). A review of the psychometric properties of generic utility measures in multiple sclerosis. *Pharmacoeconomics*, *32*(8), 759-773. https://doi.org/10.1007/s40273-014-0167-5

Lublin, F. D., Reingold, S. C., Cohen, J. A., Cutter, G. R., Sørensen, P. S., Thompson, A. J., Wolinsky, J. S., Balcer, L. J., Banwell, B., Barkhof, F., Bebo, B., Calabresi, P. A., Clanet, M., Comi, G., Fox, R. J., Freedman, M. S., Goodman, A. D., Inglese, M., Kappos, L., Kieseier, B. C., Lincoln, J. A., Lubetzki, C., Miller, A. E., Montalban, X., Connor, P. W., Petkau, J., Pozzilli, C., Rudick, R. A., Sormani, M. P., Stüve, O., Waubant, E., & Polman, C. H. (2014). Defining the clinical course of multiple sclerosis. *Neurology*, *83*(3), 278-286. https://doi.org/10.1212/WNL.0000000000000560

Malcomson, K. S., Lowe-Strong, A. S., & Dunwoody, L. (2008). What can we learn from the personal insights of individuals living and coping with multiple sclerosis? *Disability and Rehabilitation*, *30*(9), 662-674. https://doi.org/10.1080/09638280701400730

Manouchehrinia, A., Beiki, O., & Hillert, J. (2016). Clinical course of multiple sclerosis: A nationwide cohort study. *Multiple Sclerosis Journal*, *23*(11), 1488-1495. https://doi.org/10.1177/1352458516681197

Marrie, R. A., Zhang, L., Lix, L. M., Graff, L. A., Walker, J. R., Fisk, J. D., Patten, S. B., Hitchon, C. A., Bolton, J. M., Sareen, J., El-Gabalawy, R., Marriott, J. J., & Bernstein, C. N. (2018). The validity and reliability of screening measures for depression and anxiety disorders in multiple sclerosis. *Mult Scler Relat Disord*, *20*, 9-15. https://doi.org/10.1016/j.msard.2017.12.007

McCracken, L. M., & Velleman, S. C. (2010). Psychological flexibility in adults with chronic pain: a study of acceptance, mindfulness, and values-based action in primary care. *Pain*, *148*(1), 141-147. https://doi.org/10.1016/j.pain.2009.10.034

McKay, K. A., Kwan, V., Duggan, T., & Tremlett, H. (2015). Risk factors associated with the onset of relapsing-remitting and primary progressive multiple sclerosis: A systematic review. *BioMed Research International*, 817238. https://doi.org/10.1155/2015/817238

Meek, C., Topcu, G., Moghaddam, N., & das Nair, R. (2020). Experiences of adjustment to secondary progressive multiple sclerosis: A meta-ethnographic systematic review. *Disability and Rehabilitation*, 1-12. https://doi.org/10.1080/09638288.2020.1734105

Metz, L. M., & Liu, W.-Q. (2018). Effective treatment of progressive MS remains elusive. *The Lancet*, *391*(10127), 1239-1240. https://doi.org/10.1016/S0140-6736(18)30426-4

Mohr, D. C., Boudewyn, A. C., Goodkin, D. E., Bostrom, A., & Epstein, L. (2001). Comparative outcomes for individual cognitive-behavior therapy, supportive-expressive group psychotherapy, and sertraline for the treatment of depression in multiple sclerosis. *Journal of Consulting and Clinical Psychology*, *69*(6), 942-949. https://doi.org/10.1037/0022-006X.69.6.942

Moss-Morris, R., Dennison, L., Landau, S., Yardley, L., Silber, E., & Chalder, T. (2013). A randomized controlled trial of cognitive behavioral therapy (CBT) for adjusting to multiple sclerosis (the saMS trial): Does CBT work and for whom does it work? *Journal of Consulting and Clinical Psychology*, *81*(2), 251-262. https://doi.org/10.1037/a0029132

Moss-Morris, R. (2013). Adjusting to chronic illness: Time for a unified theory. *British Journal of Health Psychology*, *18*(4), 681-686. https://doi.org/10.1111/bjhp.12072

Mynors, G., Bowen, A., & Doncaster, D. (2016). *MS Specialist Nursing in the UK 2016: Report on progress towards equitable provision.* Retrieved May from https://support.mstrust.org.uk/file/MS-Specialist-Nursing-in-the-UK-2016.pdf

NICE. (2014). *MS symptom management and rehabilitation clinical guideline.* National Institute for Health and Care Excellence [NICE Guideline No. 186]. https://www.nice.org.uk/guidance/cg186/resources/multiple-sclerosis-in-adults-management-35109816059077

Nordin, L., & Rorsman, I. (2012). Cognitive behavioural therapy in multiple sclerosis: A randomized controlled pilot study of acceptance and commitment therapy. *Journal of Rehabilitation Medicine*, *44*(1), 87-90. https://doi.org/10.2340/16501977-0898

O'Neill, L., Latchford, G., McCracken, L. M., & Graham, C. D. (2019). The development of the Acceptance and Commitment Therapy Fidelity Measure (ACT-FM): A delphi study and field test. *Journal of Contextual Behavioral Science*, *14*, 111-118. https://doi.org/10.1016/j.jcbs.2019.08.008

Ong, C. W., Pierce, B. G., Petersen, J. M., Barney, J. L., Fruge, J. E., Levin, M. E., & Twohig, M. P. (2020). A psychometric comparison of psychological inflexibility measures: Discriminant validity and item performance. *Journal of Contextual Behavioral Science*, *18*, 34-47. https://doi.org/https://doi.org/10.1016/j.jcbs.2020.08.007

Orsmond, G. I., & Cohn, E. S. (2015). The distinctive features of a feasibility study: Objectives and guiding questions. *OTJR: Occupation, Participation and Health*, *35*(3), 169-177. https://doi.org/10.1177/1539449215578649

Pakenham, K. I. (2001). Coping with multiple sclerosis: Development of a measure. *Psychology, Health & Medicine*, *6*(4), 411-428. https://doi.org/10.1080/13548500126537

Potter, K.-J., Golijana-Moghaddam, N., Evangelou, N., Mhizha-Murira, J. R., & das Nair, R. (2020). Self-help acceptance and commitment therapy for carers of people with multiple sclerosis: A feasibility randomised controlled trial. *Journal of Clinical Psychology in Medical Settings*. https://doi.org/10.1007/s10880-020-09711-x

Proctor, B. J., Moghaddam, N., Evangelou, N., & das Nair, R. (2018). Telephone-supported acceptance and commitment bibliotherapy for people with multiple sclerosis and psychological distress: A pilot randomised controlled trial. *Journal of Contextual Behavioral Science*, *9*, 103-109. https://doi.org/10.1016/j.jcbs.2018.07.006

Proctor, B. J., Moghaddam, N., Vogt, W., & das Nair, R. (2018). Telephone psychotherapy in multiple sclerosis: A systematic review and meta-analysis. *Rehabilitation Psychology*, *63*(1), 16-28. https://doi.org/10.1037/rep0000182

Puhan, M. A., Frey, M., Büchi, S., & Schünemann, H. J. (2008). The minimal important difference of the hospital anxiety and depression scale in patients with chronic obstructive pulmonary disease. *Health and quality of life outcomes*, *6*, 46-46. https://doi.org/10.1186/1477-7525-6-46

Rigby, S. A., Domenech, C., Thornton, E. W., Tedman, S., & Young, C. A. (2003). Development and validation of a self-efficacy measure for people with multiple sclerosis: The Multiple Sclerosis Self-Efficacy Scale. *Multiple Sclerosis Journal*, *9*(1), 73-81. https://doi.org/10.1191/1352458503ms870oa

Ritchie, J., Spencer, L., & O'Connor, W. (2003). Carrying out qualitative analysis. In *Qualitative research practice: A guide for social science students and researchers* (pp. 219-262).

Russell, D., Peplau, L. A., & Cutrona, C. E. (1980). The revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology*, *39*(3), 472-480. https://doi.org/10.1037/0022-3514.39.3.472

Scalfari, A., Neuhaus, A., Daumer, M., Muraro, P. A., & Ebers, G. C. (2014). Onset of secondary progressive phase and long-term evolution of multiple sclerosis. *Journal of Neurology, Neurosurgery & Psychiatry*, *85*(1), 67. https://doi.org/10.1136/jnnp-2012-304333

Schulz, K. F., Altman, D. G., & Moher, D. (2010). CONSORT 2010 Statement: Updated guidelines for reporting parallel group randomised trials. *BMC Medicine*, *8*(1), 18. https://doi.org/10.1186/1741-7015-8-18

Sim, J., & Lewis, M. (2012). The size of a pilot study for a clinical trial should be calculated in relation to considerations of precision and efficiency. *Journal of Clinical Epidemiology*, *65*(3), 301-308. https://doi.org/https://doi.org/10.1016/j.jclinepi.2011.07.011

Simpson, R., Mair, F. S., & Mercer, S. W. (2017). Mindfulness-based stress reduction for people with multiple sclerosis – a feasibility randomised controlled trial. *BMC Neurology*, *17*(1), 94. https://doi.org/10.1186/s12883-017-0880-8

The Multiple Sclerosis International Federation. (2020). *Atlas of MS*. https://www.msif.org/wp-content/uploads/2020/10/Atlas-3rd-Edition-Epidemiology-report-EN-updated-30-9-20.pdf

Thompson, A. J., Banwell, B. L., Barkhof, F., Carroll, W. M., Coetzee, T., Comi, G., Correale, J., Fazekas, F., Filippi, M., Freedman, M. S., Fujihara, K., Galetta, S. L., Hartung, H. P., Kappos, L., Lublin, F. D., Marrie, R. A., Miller, A. E., Miller, D. H., Montalban, X., Mowry, E. M., Sorensen, P. S., Tintoré, M., Traboulsee, A. L., Trojano, M., Uitdehaag, B. M. J., Vukusic, S., Waubant, E., Weinshenker, B. G., Reingold, S. C., & Cohen, J. A. (2018). Diagnosis of multiple sclerosis: 2017 revisions of the McDonald criteria. *The Lancet Neurology*, *17*(2), 162-173. https://doi.org/10.1016/S1474-4422(17)30470-2

Thorne, S., Con, A., McGuinness, L., McPherson, G., & Harris, S. R. (2004). Health care communication issues in multiple sclerosis: An interpretive description. *Qualitative Health Research*, *14*(1), 5-22. https://doi.org/10.1177/1049732303259618

Tickle-Degnen, L. (2013). Nuts and bolts of conducting feasibility studies. *American Journal of Occupational Therapy*, *67*(2), 171-176. https://doi.org/10.5014/ajot.2013.006270

Topcu, G., Griffiths, H., Bale, C., Trigg, E., Clarke, S., Potter, K.-J., Mhizha-Murira, J. R., Drummond, A., Evangelou, N., Fitzsimmons, D., & das Nair, R. (2020). Psychosocial adjustment to multiple sclerosis diagnosis: A meta-review of systematic reviews. *Clinical Psychology Review*, *82*, 101923. https://doi.org/https://doi.org/10.1016/j.cpr.2020.101923

van den Akker, L. E., Beckerman, H., Collette, E. H., Eijssen, I. C. J. M., Dekker, J., & de Groot, V. (2016). Effectiveness of cognitive behavioral therapy for the treatment of fatigue in patients with multiple sclerosis: A systematic review and meta-analysis. *Journal of Psychosomatic Research*, *90*, 33-42. https://doi.org/10.1016/j.jpsychores.2016.09.002

Veillette, J., Martel, M.-E., & Dionne, F. (2019). A randomized controlled trial evaluating the effectiveness of an acceptance and commitment therapy–based bibliotherapy intervention among adults living with chronic pain. *Canadian Journal of Pain*, *3*(1), 209-225. https://doi.org/10.1080/24740527.2019.1678113

Weston, D., Parsons, V., Ntani, G., Rushton, L., & Madan, I. (2017). Mixed contact methods to improve response to a postal questionnaire. *Occupational Medicine*, *67*(4), 305-307. https://doi.org/10.1093/occmed/kqx032

Wetherell, J. L., Petkus, A. J., Alonso-Fernandez, M., Bower, E. S., Steiner, A. R. W., & Afari, N. (2016). Age moderates response to acceptance and commitment therapy vs. cognitive behavioral therapy for chronic pain. *International Journal of Geriatric Psychiatry*, *31*(3), 302-308. https://doi.org/10.1002/gps.4330

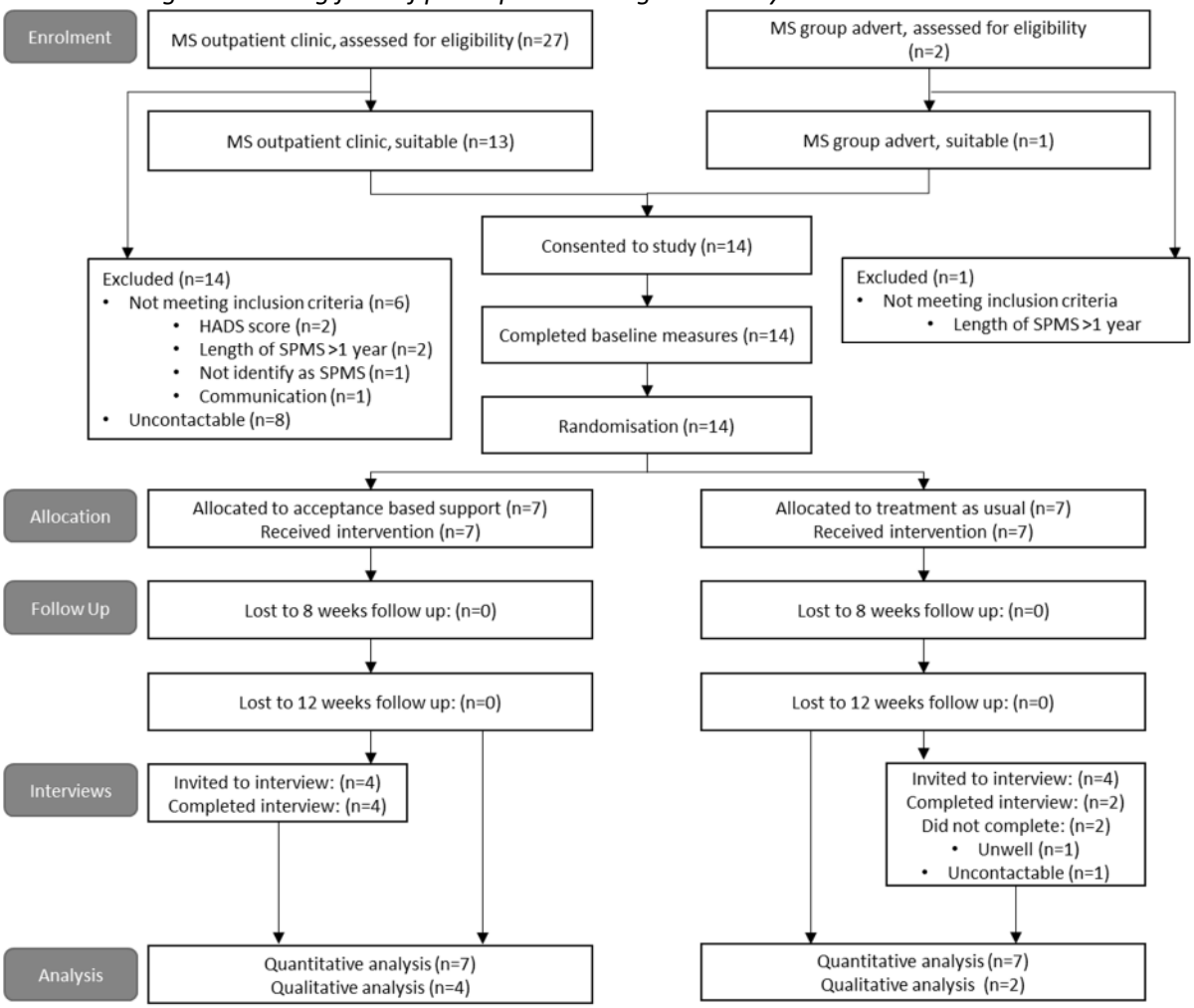
Wilkinson, H. R., & das Nair, R. (2013). The psychological impact of the unpredictability of multiple sclerosis: a qualitative literature meta-synthesis. *British Journal of Neuroscience Nursing*, *9*(4), 172-178. https://doi.org/10.12968/bjnn.2013.9.4.172

Ziemssen, T., Tolley, C., Bennett, B., Kilgariff, S., Jones, E., Pike, J., Tomic, D., Piani-Meier, D., & Lahoz, R. (2020). A mixed methods approach towards understanding key disease characteristics associated with the progression from RRMS to SPMS: Physicians' and patients' views. *Multiple Sclerosis and Related Disorders*, *38*, 101861. https://doi.org/10.1016/j.msard.2019.101861

Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatriatrica Scandinavica*, *67*(6), 361-370. https://doi.org/10.1111/j.1600-0447.1983.tb09716.x

Figure 1

CONSORT diagram showing flow of participants through the study



Note. MS: Multiple Sclerosis, SPMS: Secondary Progressive Multiple Sclerosis, HADS: Hospital Anxiety and Depression Scale

Table 1

Self-report measures used to measure change across timepoints (T^0, T^1, T^2) in the trial

Name	Concept(s) Measured	Scale Type	Response options	Min/Max score	Higher scores meaning
HADS	Anxiety, Depression	Likert	4	0/42	Greater distress
MSIS-29	Perceived impact of MS	Likert	5	29/145	Greater impact of MS
MSSE	Self-efficacy	Likert	6	14/84	Greater self-efficacy
EQ-5D-5L	Perceived health status	Visual analogue	N/A	0/100	Greater perceived health
CompACT	Psychological flexibility	Likert	7	0/138	Greater psychological flexibility

Note. HADS: Hospital Anxiety and Depression Scale, MSIS-29: Multiple Sclerosis Impact Scale, MSSE: Multiple Sclerosis Self Efficacy Scale, EQ-5D-5L: EuroQol Quality of Life, CompACT: Comprehensive Assessment of Acceptance and Commitment Therapy processes

Table 2

Analysis plan for the feasibility trial

Title	How this is measured
1: Recruitment Capability and Resulting Sample Characteristics	Descriptive statistics: The number of suitable participants who were referred, the proportion of those who were eligible, source of referral, number of participants who were excluded along with the reasons for exclusion, total number of participants recruited, recruitment rate. Framework analysis: The appeal of this intervention to the population.
2: Data Collection Procedures and Measures	Descriptive statistics: The percentage of missing online and postal data returned, number of prompt text reminders required to complete the questionnaires, and percentages of incomplete or incorrectly completed scales. Framework analysis: Acceptability of completing the measures.
3: Acceptability and Suitability of Intervention and Study Procedures	Descriptive statistics: The rate of attrition, percentage of missed face-to-face and telephone contacts and the reasons for this, average length of contacts with participants recorded in minutes, length of time participants remained in the study in weeks, number of participants asked to complete feedback interviews and percentage who agreed, and length of feedback interviews in minutes. Analysis of workbook text: Readability analysis, and reading age calculation using www.readibilityformulas.com. Framework analysis: Acceptability and suitability of the study procedures.
4: Ability to Manage and Implement Study and Intervention	Descriptive statistics: Time required for the Trial Manager to conduct recruitment, deliver therapy and manage the administrative recorded in number of days and hours, adverse events were recorded as a brief description of (i) what the event was and (ii) the effect it had.
5: Participant Responses to Intervention	Quantitative Group level analysis: Mixed model ANOVAs was used to measure differences between the two study arms over time (T^0, T^1, T^2) from measures of anxiety, depression, MS impact, self-efficacy, quality of life and psychological flexibility. Within group effect sizes and confidence intervals for each group were calculated across timepoints. Standard deviation and clinically meaningful difference scores from the literature were used with the HADS and CompACT to predict a full sample for a future RCT. Individual level analysis: RCI and CSC used to measure individual change over time (T^0, T^1, T^2) for anxiety, depression (RCI: +/- 5, CSC clinical cut-off: 7.5) and Psychological Flexibility (RCI: +/- 16, CSC clinical cut-off: 84.5). Framework analysis: Participant response to intervention.

Note. ANOVA: Analysis of Variance, T^0: baseline, T^1: eight-week follow up, T^2: 12-week follow up, HADS: Hospital Anxiety and Depression Scale, CompACT: Comprehensive Assessment of Acceptance and Commitment Therapy, RCI: Reliable Change Index, CSC: Clinically Significant Change

Table 3

Baseline Demographic and Illness Characteristics

Characteristic	Control *M (SD)*	Intervention *M (SD)*	*p* value
Age, years	51.60 (8.39)	54.40 (6.58)	0.86
Male/Female [a]	2/5	2/5	
White British/Other Ethnicity [a]	7/0	7/0	
Deprivation score	5.57 (3.11)	5.57 (2.42)	1.00
Months since SPMS diagnosis	5.4 (4.50)	6.4 (2.61)	0.62
EDSS Score	6.07 (1.01)	6.50 (0.50)	0.34

Note. [a]: t-tests were not performed as they are not continuous data, EDSS: Extended Disability Status Scale

Table 4

Baseline Clinical Characteristics

Characteristic	Control *M (SD)*	Intervention *M (SD)*	*p* value
HADS-A	13.00 (5.77)	8.57 (5.80)	0.18
HADS-D	10.00 (3.65)	8.86 (5.18)	0.64
MSIS	102.29 (21.24)	107.85 (17.70)	0.60
MSSE	38.67 (11.45)	43.00 (12.51)	0.56
EQ-5D-5L (VAS)	51.00 (25.99)	52.86 (26.44)	0.90
CompACT			
OE	24.57 (8.56)	27.71 (10.21)	0.54
BA	9.43 (4.43)	10.00 (4.55)	0.82
VA	31.42 (6.78)	34.14 (5.90)	0.44
Total	65.43 (15.63)	72.00 (12.38)	0.40

Note. HADS-A: Hospital Anxiety and Depression Scale Anxiety, HADS-D: Hospital Anxiety and Depression Scale Depression, MSIS: Multiple Sclerosis Impact Scale, MSSE: Multiple Sclerosis Self Efficacy Scale, EQ-5D-5L (VAS): EuroQol Quality of Life – Visual Analogue Scale, CompACT: Comprehensive Assessment of Acceptance and Commitment Therapy, OE: Openness to Experience, BA: Behavioural Awareness, VA: Valued Action

Table 5

The relevance of Acceptance Based Support to the Secondary Progressive MS population

	Themes			
Participant	Social Barriers	Healthcare Support	Talking Therapy	Motivation to Help
Intervention 1 F, 54yo 6m TSD	Guilt about seeking partners support: "Well, you keep your feelings to yourself anyway, you don't like to bother your partner"	Feeling guilty and being dismissed: "It feels like you're wasting your GP's time" "[Neurology staff] tell you 'Go away, that's it, we can't do anything else'"	Felt comfortable: "It's nice to talk about it to be honest with you" "to somebody who's not talking down to you"	Benefiting others with MS: "Hopefully some good comes out of [the study]"
Intervention 2 F, 57yo 6m TSD	Lack of societal understanding restricts openness: "People don't seem to have any understanding about MS … so I've only told my very close family that now it is only going to be deterioration"	Availability: "There's nothing available" "Anything would be better to help people when they have this diagnosis given to them"	Impartiality and avoiding medication: "Talking to [a therapist] that's impartial and knows exactly what you're talking about it just helps people. If it stops you from taking more medication it's got to be better hasn't it?"	Freeing up the GP: "You're leaving appointments open for really poorly people" Benefiting others with MS: "Hopefully … other people will benefit from having a few sessions with a professional"
Intervention 3 F, 64yo 1m TSD	Protecting family: "I realised that I hadn't talked to people about the whole issue of MS [transition] … I was trying not to let it affect my family and friends"	-	-	Purpose and being valued: "I like helping people, and I felt like I was involved in something again … something that I felt has a value and that I was valued."
Intervention 4 F, 47yo 4m TSD	Protecting family: "With family and friends you put on a brave face, … you're really struggling but because you don't want to upset them"	Professionals time and being dismissed: "I eventually got to see my consultant, and you don't have a lot of time to talk [about transition]" "Shoved out of the door like 'There you are now go and get on with it'"	Impartiality and reliability: "It's nice to talk to somebody who isn't in the situation … you can just say things to that you wouldn't normally" "Nice knowing that once a week … you've got someone's ear to bend"	-
Control 1 M, 52yo 5m TSD	Support available: "I've got some good friends who if I wanted to talk to them about any problems that I was feeling of facing then I could talk to them"	Frustration and feeling selfish: "I understand how busy the NHS is … but from a selfish point of view leaving a message when you really need to speak to somebody is a little frustrating"	Not needed: "I have got access to … counselling and mentoring if I need it. I never use it, ever"	Benefiting others selflessly: "I just wanted to help … so it's no skin off my nose to do that" "Somebody would benefit from my profile and disease journey"
Control 2 M, 61yo 1m TSD	-	-	-	[Interviewer: You took part to help?] "That's right, yeah"

Note. Dashes represent no appropriate quotation. F: female, M: male, yo: years old, TSD: time since diagnosis

Table 6

Participant experience of the ABS telephone sessions and workbook

	Themes	
Participant	Telephone Sessions	The Workbook
Intervention 1 F, 54yo 6m TSD	"It was nice that [support calls] had got a set time, I made myself sit down" "[Session duration] was fine" "[Session frequency] was alright"	"In MS your attention span is crap. So sometimes I had to put [the workbook] aside, leave it a few days and then come back to it" "I did [the workbook] in my own time which I did like" "I always kept [the workbook] at my side somewhere I could easily reach it"
Intervention 2 F, 57yo 6m TSD	"[Support calls] were mentally tiring" "[Support calls] were just right; I just wish that they'd been a bit longer. Say a 12-week course. I just think 6 is a bit too short" "An hour a week for 6 weeks, that would be better. Half an hour seems quite short" "Maybe you could run the [support] as a group session … to spread the money a bit further"	"Well it was absolutely fine for me … I said "I'm very sorry [researcher] but I've actually read the whole booklet because I was interested" "Filling in things that we were going to talk about … then it's in front of you for the next time" "I felt that the topics that were in the booklet were very relevant"
Intervention 3 F, 64yo 1m TSD	"[Length of support calls] is actually the right amount. Any shorter might of felt rushed, and any longer isn't really practical" "[Session frequency] is about right"	"I can say I wasn't entirely happy with [the coping strategies section], it was worded as if someone was newly diagnosed" "It was good to work through the workbook … I did find some of it very very helpful" "I sort of mentally refer to [the workbook] and think about the exercises"
Intervention 4 F, 47yo 4m TSD	"Possibly a little bit longer might have been nice … you're watching the clock thinking 'My time's nearly up'" "You can sometimes feel more free [over the telephone] to be a bit more honest because you're not actually face to face"	"It was alright. I sometimes struggled to do [workbook homework] to be honest. With [acute unrelated physical health problem] it was a bit hard to find time to do it and to be in the right head space to do it" "It's a bit like being back at school, like you feel guilty that you haven't done [homework]"

Note. F: female, yo: years old, TSD: time since diagnosis

Table 7

Mixed ANOVA with interaction effects (T^0 is baseline, T^1 is 8-week follow-up, T^2 is 12-week follow-up)

Measure	T^0		T^1		T^2		F value (*p*)
	Control	Intervent-	Control	Intervent-	Control	Intervent-	
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	
HADS-A	13	8.6	12.29	8.57	10.00	9.43	3.21
	(5.77)	(5.80)	(5.65)	(4.69)	(5.51)	(4.79)	(0.10)
HADS-D	10	8.86	10.29	8.86	9.00	8.43	0.12
	(3.65)	(5.12)	(4.46)	(3.80)	(5.54)	(3.78)	(0.89)
MSIS	102.29	107.85	104.43	107.29	100.43	105.00	0.41
	(21.24)	(17.70)	(20.46)	(19.20)	(16.98)	(17.25)	(0.54)
MSSE[a]	35.67	36.33	34.00	35.00	36.00	37.33	0.01
	(16.26)	(9.87)	(15.52)	(6.00)	(15.87)	(5.51)	(0.93)
EQ-5D-5L	51.00	52.86	36.43	41.43	43.71	43.86	0.10
	(25.99)	(26.43)	(26.41)	(19.73)	(23.31)	(22.45)	(0.75)
CompACT							
OE	24.57	27.71	24.86	28.14	30.83	29.00	0.31
	(8.56)	(10.21)	(6.07)	(8.36)	(15.84)	(10.38)	(0.59)
BA	9.43	10.00	10.29	8.00	14.50	13.14	0.49
	(4.43)	(4.55)	(4.96)	(3.70)	(8.12)	(6.69)	(0.50)
VA	31.42	34.14	30.14	33.00	31.17	31.43	0.78
	(6.78)	(5.90)	(8.59)	(7.53)	(8.50)	(6.90)	(0.40)
Total	65.43	72.00	65.29	69.14	76.50	73.57	0.36
	(15.63)	(12.38)	(69.14)	(13.72)	(28.63)	(10.32)	(0.56)

Note. HADS-A: Hospital Anxiety and Depression Scale Anxiety, HADS-D: Hospital Anxiety and Depression Scale Depression, MSIS: Multiple Sclerosis Impact Scale, MSSE: Multiple Sclerosis Self Efficacy Scale, EQ-5D-5L: EuroQol Quality of Life – Visual Analogue Scale, CompACT: Comprehensive Assessment of Acceptance and Commitment Therapy, OE: Openness to Experience, BA: Behavioural Awareness, VA: Valued Action, [a]: $n = 3$.

Table 8

Effect sizes with p values for the two groups

Measure	Intervention				Control			
	$T^0 - T^1$		$T^0 - T^2$		$T^0 - T^1$		$T^0 - T^2$	
	Effect size (95% CI)	*p*	Effect size (95% CI)	*p*	Effect size (95% CI)	*p*	Effect size (95% CI)	*p*
HADS-A	0.00 (-1.60, 1.60)	1.000	-0.54 (-2.17, 1.09)	0.530	0.47 (-1.15, 2.10)	0.583	1.91 (-0.03, 3.83)	0.058
HADS-D	0.00 (-1.60, 1.60)	1.000	0.24 (-1.37, 1.84)	0.782	-0.18 (-1.80, 1.42)	0.826	0.55 (-1.08, 2.18)	0.527
MSIS	0.11 (-1.49, 1.71)	0.896	0.46 (-1.17, 2.08)	0.596	-0.41 (-2.03, 1.20)	0.628	0.30 (-1.31, 1.91)	0.729
MSSE[a]	-0.41 (-3.21, 2.39)	0.781	0.66 (-2.18, 3.51)	0.656	-0.52 (-3.33, 2.30)	0.728	0.33 (-3.87, 4.53)	0.881
EQ-5D-5L	-1.07 (-2.78, 0.64)	0.239	-0.96 (-2.66, 0.73)	0.282	-1.36 (-3.14, 0.42)	0.146	-0.78 (-2.44, 0.88)	0.376
CompACT								
OE	0.10 (-1.51, 1.70)	0.911	0.18 (-1.42, 1.79)	0.829	0.10 (-1.50, 1.71)	0.903	0.70 (-0.94, 2.36)	0.420
BA	-1.08 (-2.80, 0.63)	0.233	1.02 (-0.68, 2.72)	0.258	0.67 (-0.98, 2.31)	0.445	1.45 (-0.35, 3.25)	0.126
VA	-0.40 (-2.02, 1.21)	0.639	-1.01 (-2.71, 0.69)	0.261	-0.71 (-2.36, 0.94)	0.419	-0.06 (-1.66, 1.54)	0.946
Total	-0.42 (-2.04, 1.20)	0.623	0.14 (-1.46, 1.74)	0.870	-0.18 (-1.79, 1.42)	0.830	0.82 (-0.84, 2.49)	0.376

Note. T^0: baseline, T^1: 8-week follow-up, T^2: 12-week follow-up. Effect sizes with a negative (-) sign are in the direction of deterioration. HADS-A: Hospital Anxiety and Depression Scale Anxiety, HADS-D: Hospital Anxiety and Depression Scale Depression, MSIS: Multiple Sclerosis Impact Scale, MSSE: Multiple Sclerosis Self Efficacy Scale, EQ-5D-5L: EuroQol Quality of Life – Visual Analogue Scale, CompACT: Comprehensive Assessment of Acceptance and Commitment Therapy, OE: Openness to Experience, BA: Behavioural Awareness, VA: Valued Action, [a]: $n = 3$.

Table 9

Number of participants showing reliable improvement or deterioration compared to Baseline (T^0)

Measure	T^1						T^2					
	Control			Intervention			Control			Intervention		
	↑	↓	↔	↑	↓	↔	↑	↓	↔	↑	↓	↔
HADS-A	1	0	6	0	0	7	1	0	6	0	1	6
HADS-D	0	1	6	0	0	7	2 *(1)*	1	4	1 *(1)*	1	5
CompACT^T	0	2	5	1 *(1)*	2	4	3 *(2)*	1	3	1 *(1)*	0	6

Note. HADS-A: Hospital Anxiety and Depression Scale Anxiety, HADS-D: Hospital Anxiety and Depression Scale Depression, CompACT^T: Comprehensive Assessment of Acceptance and Commitment Therapy Total, ↑: Improvement, ↓: Deterioration, ↔ : No change, Parentheses: number crossing clinical threshold

Table 10

Participant feedback on psychological flexibility, mindset and coping, and experience of the intervention

	Themes		
Participant	Psychological Flexibility and ACT Processes	Mindset and Coping	Intervention Experience
Intervention 1 F, 54yo 6m TSD	-	-	"[Therapy] was beneficial for myself, it really was" "I did enjoy [therapy]"
Intervention 2 F, 57yo 6m TSD	"You … have your moment of panic and then you go 'No, let's think about this rationally, let's think about what [therapist] said'" "That's another of my values that I'm letting go … thinking 'Gosh, I hadn't realised that's what I'd done'" "I loved the [ACT metaphor] with the boat, like I said to you, and I thought 'God I've thrown everyone off me boat!'"	"I felt as if a weight had been lifted off my mind actually. And I felt more positive about the future"	"Well I hope you do do this work again in the future because I know what a benefit it did for me" "I really enjoyed it actually … I found it a very positive experience"
Intervention 3 F, 64yo 1m TSD	"[I learnt to] focus on being in the moment a lot more and I now use it a lot more for my day-to-day life" "The mindfulness made me realise that I could actually build that into my day" "I was so busy managing my health that I wasn't actually looking to the future, I wasn't sailing my boat [ACT metaphor], I was bailing" "It made me realise what I really want to do, which is to help my family and friends and be there for them"	"It's really moved me forward … in terms of acceptance" "I thought I was quite good at letting things go … [the] process helped me to let go more effectively" "I've developed my coping strategies" "It made me look towards the future and what I wanted, and what my values were, and where I wanted to head"	"Everything has been beneficial"
Intervention 4 F, 47yo 4m TSD	"It made you stop and think … [not] just sort of going with the flow" "I do try to be little bit more mindful … taking a step back"	"It really helped me come to terms with it, and to get some ways in which to manage how I was feeling" "I think it made things a bit easier to manage. I wouldn't say cope, but manage how you're feeling" "[Change is] not easy because it's breaking long instilled habits" "It's just a case of being a kick-ass MS warrior really and getting on with it"	"I found [therapy] incredibly helpful" "[Therapy was a] little lifeline in amongst all the other rubbish that's going off"

Note. Dashes represent no appropriate quotation. F: female, yo: years old, TSD: time since diagnosis