Psychological Interventions for Post-Stroke Adjustment and Mood

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Thesis submitted in partial fulfilment of the degree of Doctorate in Clinical Psychology

University of East Anglia

Faculty of Medicine and Health Sciences

Date of Submission: 20th April 2026

Portfolio Word Count: 32,170

Candidate Registration Number: 100204058

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Portfolio Abstract

Background: Difficulty adjusting after stroke is prevalent and access to psychological support in the UK remains a pertinent challenge. Group psychological therapies, particularly when delivered remotely, may alleviate some healthcare pressures and increase access to mental health support after stroke. Acceptance and Commitment Therapy (ACT) is a psychological intervention that aligns with models of adjustment in chronic health, resulting in a growing evidence base for stroke survivors.

Methods: A systematic review and meta-analysis assessed the efficacy of group-based psychological intervention on post-stroke mood (anxiety and depression). The empirical study used a concurrent multiple baseline single case experimental design to assess the preliminary efficacy of an ACT group delivered via telerehabilitation for post-stroke adjustment. Five stroke survivors completed self-report measures of psychological flexibility (PF), distress, participation, quality of life and wellbeing. Preliminary feasibility and aspects of acceptability were assessed, supported by participant feedback.

Results: A meta-analysis of eight publications found very low certainty of evidence that group-based psychological therapies impact mood post-stroke. Some concerns for risk of bias and substantial heterogeneity were noted. The empirical study found no base effect of the intervention on PF. Increasing intervention trends indicated a cumulative effect on PF. Mixed findings of reliable and clinically significant change was noted on other psychosocial outcomes. Preliminary assessment indicated the intervention may be feasible for pilot clinical trials, and core aspects of acceptability were supported.

Conclusion: Further research is required to understand the efficacy of group-based psychological therapies for post-stroke mood, and further research of an ACT group delivered via telerehabilitation for adjustment post-stroke is warranted. Research must ensure high methodological quality of future clinical trials and consider multiple domains of psychological adjustment. Implications on research and clinical practice are considered throughout the portfolio.

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Acknowledgements

I would like to sincerely thank my supervisors, Dr Joshua Blake, Dr Tom Steverson, and Dr Jinnie Ooi, for their guidance, expertise, and encouragement throughout this project. Their support helped me to overcome many challenges during training, so I could not have completed this work without them.

This project also would not have been possible without Dr Rebecca Large, Dr Reg Morris, Laura Hook, Thomas Jones, the Community Neurological Rehabilitation Service (CNRS) and the Neuro-Stute Recovery College who developed the online ACT group intervention. I am grateful for their generosity in providing us with the protocol and resources required to undertake this study.

I am incredibly grateful to Dr Rachel Metcalfe-Hume and the ESD team at Norfolk Community Health and Care NHS Foundation Trust, as well as the clinicians listed on the UKISPN mail list and UK Facebook stroke group co-ordinators, for investing so much time in supporting participant recruitment.

A huge thank you, also, to the participants, who generously gave their time and openly shared their experiences of life after stroke. Their commitment to the study, despite the challenges they face, is greatly appreciated.

A special thank you to my parents and my partner, Luke Hutton, for their encouragement and patience throughout my clinical training. I am especially grateful to Lucy Ackerman for her friendship and support throughout this process.

Lastly, I would like to thank my grandma for her regular check-ins and for listening to all my research brainstorms. Thank you for always believing in me through moments of self-doubt.

Chapter 1: Introduction

The global incidence of stroke is increasing (Yang et al., 2025), affecting 12 million people each year (Feigin et al., 2025). It is estimated that 94 million people globally are living with its consequences, and 65% are below the age of 75 years (Feigin et al., 2025). However, with more than 1.3 million stroke survivors in the UK alone, stroke is regarded as one of the leading causes of disability in the UK (NICE, 2023a; Stroke Association, 2017).

Stroke risk increases exponentially with age (Truelsen et al., 2006), but can leave individuals facing sudden and unexpected physical, cognitive, social and emotional difficulties lasting a lifetime (Mahmoud & Elaziz, 2016). These challenges can have a detrimental impact on an individual's life, affecting their mood (Hilari, 2011), independence in activities of daily living (Hilari, 2011; Lazar & Boehme, 2017) and ability to engage in meaningful social interactions (Vickers, 2010). It is therefore common for stroke survivors to experience difficulty adjusting to the new circumstances (Jones et al., 2008; Mahmoud & Elaziz, 2016), noting a deterioration in mood, including symptoms of depression (Damsbo et al., 2020) and anxiety (Knapp et al., 2020).

Psychological therapies are therefore recommended in National Institute for Health and Care Excellence (NICE) Guidelines for adults with chronic physical health conditions (NICE, 2009). Psychological therapies are interventions that focus on modifying unhelpful thoughts and behaviours, or target emotional regulation skills for the primary purpose of improving wellbeing or reducing distress (Easdale-Cheele et al., 2024; Saccaro et al., 2024). Some examples include Cognitive Behavioural Therapy (CBT), Acceptance and Commitment Therapy (ACT), mindfulness-based interventions, dialectal behavioural therapy (DBT), compassion focussed therapy (CFT), and reminiscence therapy. Such therapies, often led by an experienced healthcare clinician, address the presenting difficulty by identifying goals and supporting clients to find solutions, foster agency, build resilience and implement change (Tribe & Tunariu, 2018). Post-stroke, manualised psychological therapies should be modified to include the trauma, physical and psychological losses, and cognitive and communication difficulties experienced after a stroke (Broomfield et al., 2011; Kneebone, 2016).

While psychological therapies were traditionally delivered as a 1:1 intervention (Wedding, 2010), group-based therapies have evolved to be an equally effective alternative

for treating mental health difficulties (Yalom & Leszcz, 2020). The central tenets more potent in group therapies (compared to individual therapies) include instillation of hope, universality, interpersonal learning, group cohesiveness, altruism, catharsis, and existential factors (meaning making) (Yalom & Leszcz, 2020). Collectively, these factors promote the development of a supportive environment through connection, creating a sense of security and safety that enables personal growth in coping with distress (Yalom & Leszcz, 2020). This is particularly important for those living with long-term health conditions due to the prevalence of isolation and loneliness (Petitte et al., 2015) and its association with poor psychosocial outcomes (World Health Organization, n.d.).

Beyond the within group factors, group therapies also pose benefits for the wider healthcare system. Systematic reviews have found that group-based therapies are more cost-effective than individual therapies when treating psychological difficulties across many healthcare settings (McDermut et al., 2001; Nicklas et al., 2022). They provide the opportunity for services to treat multiple clients at once with the same number of resources (Hawes et al., 2025; Huntley et al., 2012). This means that group therapies may support management of service pressures, increasing access to psychological therapies, particularly for those from minority backgrounds (Whittingham et al., 2023).

When considering accessibility to healthcare services and in particular, psychological interventions, following the Covid-19 pandemic, many therapists moved to holding groups online via teleconferencing methods (Weinberg, 2021). Remote, online therapy has been considered more convenient and accessible (Amulya, 2020; Ellett et al., 2022), particularly in the context of travelling to appointments as those with mental health difficulties are more likely to have chronic physical health comorbidities or disabilities (Mirza et al., 2021; Scott et al., 2016; Zhou et al., 2024). Online group therapies therefore also help to eliminate barriers to accessing therapies based on geography (Yalom & Leszcz, 2020).

This thesis therefore aims to explore group-based psychological interventions for post-stroke mood by summarising and evaluating the current evidence base and empirically assessing a group-based psychological intervention delivered via telerehabilitation. Due to the potential for online group-based therapies to increase access to mental health support, this thesis also considers the preliminary feasibility and acceptability of such interventions post-stroke. Each chapter will therefore further discuss the current literature on group-based

psychological therapies post-stroke, with consideration to telerehabilitation and accessibility to healthcare.

Chapter 2 is a systematic review and meta-analysis exploring whether group-based psychological interventions are effective at improving post-stroke anxiety and depression. Chapter 3 bridges the systematic review and empirical project presented in Chapter 4. Chapter 4 therefore starts to address gaps in the research using a single-case experimental design, aiming to assess whether group-based ACT delivered via telerehabilitation is effective for post-stroke adjustment. It uses measures of psychological flexibility, psychological distress, quality of life, participation and wellbeing. Finally, Chapter 5 brings the findings of the systematic review and empirical project together, critically evaluating the project and discussing the implications for clinical practice and future research with reference to post-stroke services and healthcare.

Chapter 2: Systematic Review and Meta-Analysis

The Efficacy of Group-Based Psychological Interventions on Mood for Stroke Survivors: A Systematic Review and Meta-Analysis

The Efficacy of Group-Based Psychological Interventions on Mood for Stroke Survivors: A Systematic Review and Meta-Analysis

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Word Count (including abstract and references, excluding tables and figures): 9084

Prepared for submission to Neuropsychological Rehabilitation (guidelines presented in Appendix A)

Abstract

Background and Aims: Group-based therapies offer benefits of peer support and connection, reducing isolation and promoting wellbeing. This systematic review therefore aimed to assess the efficacy of group-based psychological interventions on anxiety and depression post-stroke.

Method: Three databases were searched on 4th September 2025 (Medline Ultimate, CINAHL Ultimate and APA PsycINFO). Randomised controlled trials of adult stroke survivors comparing anxiety and depression following group-based psychological therapy interventions against a control group were eligible. Meta-analysis used standardised mean difference (Hedges *g)* with random effects models. The Revised Cochrane RoB-2 tool was used to assess risk of bias (RoB) and GRADE (Grading of Recommendations Assessment, Development and Evaluation) supported assessment of certainty of evidence.

Results: Of 7807 results, eight publications with 1129 participants were eligible for meta-analysis following screening by two researchers and assessment of RoB. Sensitivity analyses of six studies showed a significant moderate effect for depression (g = 0.78, 95% CI [0.15, 1.41], p = 0.0158), and four studies showed a non-significant effect for anxiety (g = 0.49, 95% CI [-0.0108, 0.9915], p = 0.0551). Substantial heterogeneity was found across all analyses, and GRADE identified very low certainty of evidence. Publication bias was not assessed due to the small number of included studies. Sub-group analysis for intervention type is described.

Conclusions: There is very low certainty as to whether group-based psychological therapies impact mood (anxiety and/or depression) post-stroke. Limitations of eligible studies and this meta-analysis are discussed, followed by recommendations for future research and implications for clinical practice.

Key Words: Stroke, psychological intervention, group intervention, mood, anxiety and depression.

Introduction

The prevalence of post-stroke anxiety and major depression is 18.7%-24.2% (Knapp et al., 2020) and 17.7% (Mitchell et al., 2017) respectively, with symptoms persisting for several years (Burton et al., 2013; Hackett & Pickles, 2014) and often co-occurring (Stein et al., 2018). These emotional challenges can negatively impact an individual's rehabilitation progress (Kim, 2016) including functional status (Stein et al., 2018). Accordingly, psychological interventions are among the top 10 priorities for stroke rehabilitation research in the UK (James Lind Alliance, n.d.; Stroke Association, 2021).

Psychological interventions, defined as structured activities that aim to positively alter feelings, and maladaptive behaviours and cognitions (Sin & Lyubomirsky, 2009; Van Agteren et al., 2021), are recommended in stroke rehabilitation guidelines to support adults experiencing difficulties with emotional functioning and post-stroke adjustment (NICE, 2023c). Psychological interventions can vary depending on the presenting problem and level of severity, but it is recommended that they include information and resources, goal setting, and problem solving (Gillham & Clark, 2011). Common approaches showing promise for treating mood difficulties such as anxiety and/or depression post-stroke when delivered on an individual basis include cognitive behavioural therapy (CBT) (Ahrens et al., 2023; Wan et al., 2024; Wang et al., 2018), behavioural therapy (Cobley, 2016), motivational interviewing (Fu et al., 2025; Qiqi et al., 2021), mindfulness based interventions (Han, 2023; Hisan et al., 2025; Tao et al., 2022), and acceptance and commitment therapy (ACT) (Graham et al., 2015; Han, 2023; Ooi & Steverson, 2023) as they teach coping strategies for navigating post-stroke challenges and emotion regulation (Lei et al., 2025).

The UK's National Health Service (NHS) faces significant pressures that have contributed to long waitlists across the system (Harker et al., 2025). Consequently, many, including stroke survivors, do not have access to the rehabilitation or psychological treatment they require in a timely manner (Hargroves & Lowe, 2022). Group-based therapy, where more than one individual receives treatment simultaneously with opportunity to engage with each other (American Psychological Association, 2018a), is one way to overcome this as it increases access to the same treatment resource, whilst also reducing service costs (Whittingham et al., 2023).

Unlike individual therapy, group-based interventions generally provide opportunities for peer support, learning from others, social connection (McGlashan et al., 2025), universality and shared experience (Yalom & Leszcz, 2005). Stroke survivors are reported to particularly value these features of group-based interventions as it promotes a sense of support and togetherness (Gillham & Clark, 2011), helping to reduce feelings of isolation and improve wellbeing (Elayoubi et al., 2023). It is therefore argued that group-based psychological interventions produce similar outcomes to individual therapies (Burlingame & Strauss, 2021). A systematic review by McGlashan et al. (2025) found that group-based interventions targeting psychological and social functioning are effective in improving psychosocial outcomes such as anxiety, depression, emotional distress, quality of life and social support in adults with an acquired brain injury, including stroke. However, this analysis included studies of a variety of neurological conditions, and it remains unclear how efficacy varied across conditions and severities.

Various randomised controlled, feasibility and pilot trials have been undertaken to provide insights into the efficacy of group-based interventions for stroke survivors. For example, Niu et al. (2022) explored whether five sessions of group-based ACT were effective in improving depression in adult stroke survivors compared to usual care, finding that depression was significantly lower at one and three month follow up in the ACT group. When delivered online, Patchwood et al. (2024) report that group-based ACT may also be a feasible intervention post-stroke. Group mindfulness feasibility and pilot trials had mixed findings; a 12-week movement-based mindfulness group showed some initial promise for anxiety, depression and memory (Hancock et al., 2025), while Udvardi et al. (2024) found no difference in depression and trait anxiety between a six-week mindfulness group and usual care, which they report may have been due to low baseline scores. The challenge, however, is that these psychological group interventions are yet to be considered collectively, meaning the extent to which they are effective in treating emotional difficulties post-stroke remains unclear, potentially hindering further advancements in clinical research and practice.

Stroke mental health research has primarily focused on outcomes of depression (Rafsten et al., 2018) despite its co-occurrence (Stein et al., 2018) and comparable prevalence with anxiety four months (Sagen et al., 2009) and one-year post-stroke (Chun et al., 2022). Specifically, Rafsten et al. (2018) explored post-stroke anxiety in a systematic

review, reporting clear disparities between the number of intervention trials focusing on outcomes of depression compared to anxiety despite collecting its data with combined depression-anxiety scales like the Hospital Anxiety and Depression Scale (HADS). They also found that anxiety influences quality of life and predicts depression post-stroke, emphasising a need for increased screening and consideration of anxiety post-stroke in both research and clinical settings (Rafsten et al., 2018). It is therefore important, for systematic reviews to continue exploring the impact of interventions on anxiety and depression together to ensure a more holistic understanding of treatments for emotional difficulties commonly faced post-stroke.

Equally, while post-stroke depression and anxiety share the same diagnostic criteria as anxiety and depression in the general population, their underlying mechanisms may differ given the neurobiological impact of stroke and how this impacts the psychological response to changes in functioning, independence and participation following stroke (Hoertel & Limosin, 2020; Xie et al., 2026). It is therefore necessary to assess the efficacy of psychological interventions specifically in post-stroke populations.

This systematic review therefore aims to assess whether group-based psychological interventions are efficacious in improving mood (anxiety and depression) post-stroke. In understanding this, accessibility to and experiences of stroke services can be improved, offering opportunities for more optimised recovery and rehabilitation post-stroke.

Methodology

The systematic review protocol was registered with the International Systematic Review Registry (PROSPERO) on 10th November 2025 (Registration Number: CRD420251184467). Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021) were followed (Appendix B, Table B1 and B2).

Search Strategy

Three electronic databases were searched on 4th September 2025 (Medline Ultimate, CINAHL Ultimate and APA PsycINFO). Following liaison with a specialist librarian and consultation of relevant Medical Subject Headings (MeSH), final terms searched in titles and abstracts referred to stroke, randomised control trial (RCT) and mood. Specific search string used is presented in Appendix C.

Eligibility Criteria

Studies must have been peer-reviewed, have full text available and be available in the English language. To support development of the eligibility criteria and study selection, the PICO(S) framework was followed, as recommended for intervention-based research questions (Hosseini et al., 2024). Figure 1 below outlines the PICO(S) criteria for this review.

Figure 1

PICO(S) Framework

Population	Adults (18 years+) who have suffered a stroke.
Intervention	Group-based psychological therapy interventions.
Comparison	Control group, including treatment as usual, wait list comparison or active intervention (medication).
Outcomes	Mood (depression or anxiety) assessed by validated self-report scales. Observational and qualitative studies are excluded.
Study	Randomised control trials (RCT).

Group interventions were defined as two or more individuals receiving treatment/intervention simultaneously (with opportunity to interact with each other) by one or more healthcare professional. This definition is based on the APA Psychology definition of groups (American Psychological Association, 2018b) and continued education activity (Malhotra & Baker, 2022). Psychological interventions were defined as any intervention that focuses on modifying unhelpful thoughts and behaviours or targeting emotional regulation skills for the primary purpose of improving wellbeing or reducing distress (Van Agteren et al., 2021).

Procedure

The primary researcher (HA) searched databases and removed duplicate studies using Rayyan, an artificial intelligence and machine learning platform to support article screening (Ouzzani et al., 2016). All titles and abstracts were screened by the primary researcher, followed by full-text screening of all remaining articles. A second coder (YN)

independently screened a random sample of 25% (n = 1322) of titles and abstracts and 100% of full-text articles.

At each screening stage, conflicts were resolved between the primary researcher and second coder. After screening titles and abstracts, there was 97.6% agreement, and after screening full text, there was 92.78% agreement prior to resolving. A third reviewer was not required for resolving disagreements.

Quality Assessment

The Revised Cochrane RoB-2 tool was used to assess Risk of Bias (RoB) (Sterne et al., 2019). The tool is recommended for randomised controlled trials and is made up of five domains covering randomisation, deviations, missing data, outcome measures, and outcome reporting (Sterne et al., 2019). Each item was answered as 'yes', 'probably yes', 'no', 'probably no', or 'no information' to provide a final risk rating of low, some concerns or high for each domain (Sterne et al., 2019). Details on the direction of the RoB were reported as in favour of the experimental/comparator condition, towards/away from the null, unpredictable or not applicable (Sterne et al., 2019). In line with the Revised Cochrane RoB-2 protocol, the RoB for all five domains are then reviewed together, to provide an overall rating of low, some concerns or high RoB, whereby one domain rated as having high or some concerns for RoB was sufficient to rate the overall RoB as high or of some concern (Sterne et al., 2019).

The primary researcher (HA) and second coder (YN) both independently assessed 100% of the articles for RoB. There was 92.78% agreement between reviewers. Disagreements in ratings were discussed between the reviewers and resolved without a third reviewer.

Data Extraction

The primary reviewer extracted data from included studies. Data included author, year, population (age, diagnosis and time since stroke), study design, intervention (type of intervention, location/format, clinicians, intervention structure/content and group size), control group, and analysis outcomes of anxiety and depression, including outcome

measures used (validated self-report scales), mean scores and standard deviation, and the time points the data was collected post-intervention.

Data Synthesis

Studies were grouped based on outcome (anxiety or depression) for the analysis. Meta-analyses used the standardised mean difference (Hedge's g) with random-effects models (Hedges & Olkin, 2014), and where high risk of bias is identified, sensitivity analyses were applied to assess impact on outcome (Deeks et al., 2024). Only available data were used for synthesis; no data conversions or imputations were required. Synthesised data is presented using summary tables and forest plots. Due to the heterogeneity of studies, however, intervention sub-group meta-analyses were only conducted for three ACT studies assessing depression. As per recommendations by (Page et al., 2024), tests of publication bias are not conducted as fewer than 10 studies result in underpowered and unreliable assessments.

To assess the certainty and strength of evidence for depression and anxiety, the GRADE (Grading of Recommendations Assessment, Development and Evaluation) approach was used as recommended by Schünemann et al. (2023), following guidance from Prasad (2024). Studies included after sensitivity analyses are rated for study design, risk of bias, inconsistency, indirectness, imprecision and publication bias (Prasad, 2024; Schünemann et al., 2023). Imprecision is based on the guidance for optimal information size (OIS) that a pooled sample of at least 400 participants per group is required to ensure confidence in results (Guyatt et al., 2011; Ryan & Hill, 2016; Schünemann et al., 2022) and that wide confidence intervals, irrespective of sample size indicate imprecision (Guyatt et al., 2011). Confidence intervals are considered wide if they range from no effect to large effect (Centers for Disease Control and Prevention, 2024).

Randomised controlled trials are rated as high confidence (Prasad, 2024) and either downgraded, upgraded or kept at the same level (Schünemann et al., 2023). If an issue is identified, it is rated as 'serious' or 'very serious', resulting in a downgrade of one or two levels (Schünemann et al., 2023). Overall certainty ratings are established from a continuum of high, moderate, low and very low certainty (Prasad, 2024).

Results

Study Selection

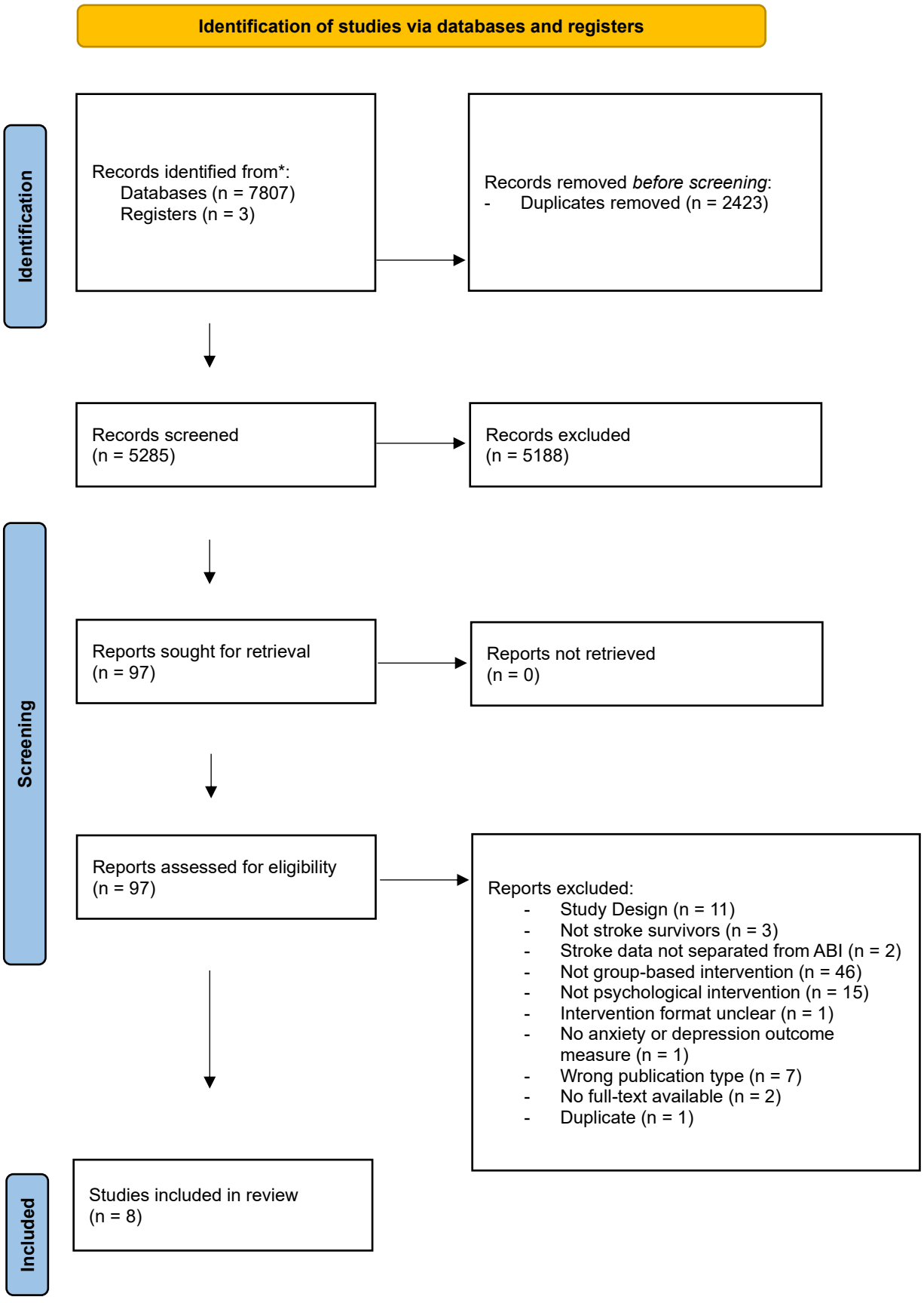
After duplicates were removed, 5285 publications were screened for eligibility. After screening titles and abstracts, 97 studies remained and underwent full-text screening. Eight studies with a total of 1129 participants were subsequently included in the systematic review. Figure 2 outlines this process. Where studies did not meet more than one inclusion criteria at full-text screening, only the primary reason for exclusion is reported in Figure 2.

Of note, Jones et al. (2025) did not primarily set out to assess anxiety or depression and instead focussed on fatigue. This study was included due to the psychological nature of the intervention and the role of sleep and fatigue in mood (Konjarski et al., 2018; Xiao et al., 2020; Zhang et al., 2025). Sensitivity analyses will therefore assess the effectiveness of psychological interventions on mood, with and without this study, to determine its impact on the outcome.

A further three studies may have been eligible for inclusion in this systematic review, however two lacked specific details of the intervention format (group or individual therapy) (Chow et al., 2023; Duan et al., 2023), and a third did not provide raw data (mean and standard deviations) for anxiety and depression scores immediately after the intervention (Cheng et al., 2021). Named researchers were contacted to confirm these details, but were not reachable, so these studies were excluded from the final selection.

Figure 2

PRISMA Flowchart



Included Studies

An overview of the included study's characteristics are provided in Table 1. Five were conducted in China (Liu et al., 2023; Niu et al., 2022; Xiong et al., 2025; Yu et al., 2023; Yue et al., 2024), one in New Zealand (Jones et al., 2025), one in the United Kingdom (Majumdar & Morris, 2019) and one in Hungary (Udvardi et al., 2024).

All eight studies had a predominantly male sample in both intervention and control groups, with a mean male to female ratio of 39:23 s. Six studies report a mean age between 60 and 67 across conditions (Jones et al., 2025; Liu et al., 2023; Majumdar & Morris, 2019; Niu et al., 2022; Yu et al., 2023; Yue et al., 2024), while Udvardi et al. (2024) had a slightly younger mean age of 55 and 59 respectively for each group. Xiong et al. (2025) did not provide an overall mean age for each group.

Four studies did not report the type of strokes participants had suffered (Liu et al., 2023; Majumdar & Morris, 2019; Yu et al., 2023; Yue et al., 2024) but the most common diagnosed was an (acute) ischaemic stroke in both the intervention and control conditions (Jones et al., 2025; Niu et al., 2022; Udvardi et al., 2024). Other types of stroke participants had suffered included intracerebral haemorrhage, subarachnoid haemorrhage (Jones et al., 2025), cerebral infarction (Xiong et al., 2025), haemorrhagic stroke (Udvardi et al., 2024; Xiong et al., 2025), stroke caused by cerebrovascular disease, brainstem haemorrhage and non-specific stroke (Xiong et al., 2025).

Sample size at the point of analysis (post-intervention) varied across studies, ranging from 26 to 200 in both the intervention and control groups (Jones et al., 2025; Liu et al., 2023; Majumdar & Morris, 2019; Niu et al., 2022; Udvardi et al., 2024; Xiong et al., 2025; Yu et al., 2023; Yue et al., 2024). The mean sample size was 70.75 for the intervention group and 70.38 for the control group. However, Jones et al. (2025) report a sample size of 200 in each group which is more than double each of the remaining studies. For the remaining seven studies, the mean sample size was 52.29 for the intervention group and 51.86 for the control group, ranging from 26 to 78 and 27 to 83 respectively (Liu et al., 2023; Majumdar & Morris, 2019; Niu et al., 2022; Udvardi et al., 2024; Xiong et al., 2025; Yu et al., 2023; Yue et al., 2024).

Table 1

Characteristics of Included Studies

Study	Country	Stroke Type		Sample Size at Analysis (*N*)		Sex (% Male)		Age (Years) M (SD)	
		Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control
Jones et al. (2025)	New Zealand	IS = 83 IH = 13 SH = 4	IS = 79 IH = 16 SH = 5	200	200	58.00	55.00	64.50 (12.9)	66.00 (12.3)
Liu et al. (2023)	China	Not reported	Not reported	70	69	57.14	73.91	62.21 (9.937)	61.61 (10.843)
Majumdar et al. (2019)	United Kingdom	Not reported	Not reported	26	27	80.77	40.74	65.30 (11.9)	60.00 (15.6)
Niu et al. (2022)	China	AIS = 52	AIS = 52	49	48	69.23	61.54	61.50 (11.5)	64.80 (12.1)

Udvardi et al. 2024)	Hungary	IS = 36 HS = 10	IS = 34 HS = 10	43	37	63.27	61.36	55.00 (12.49)	59.00 (9.67)
Xiong et al. (2025)	China	CI = 10 HS = 7 CVD = 6 BH = 3 S = 3	CI = 9 HS = 8 CVD = 5 BH = 3 S = 2	27	29	59.26	65.52	18-29 = 24.60 (4.3) 30-49 = 39.80 (5.3) 50-79 = 63.20 (6.4) 80+ = 82.30 (5.2)	18-29 = 25.10 (4.0) 30-49 = 40.20 (5.2) 50-79 = 63.70 (6.2) 80+ = 82.80 (5.1)
Yu et al. (2023)	China	Not reported	Not reported	73	70	64.20	65.82	66.10 (8.0)	66.90 (8.2)
Yue et al. (2024)	China	Not reported	Not reported	78	83	62.50	73.86	65.40 (-)	67.30 (-)

Note: Ischaemic Stroke (IS), Intracerebral Haemorrhage (IH), Subarachnoid Haemorrhage (SH), Acute Ischaemic Stroke (AIS), Cerebral Infarction (CI), Haemorrhagic Stroke (HS), Cerebrovascular Disease (CVD), Brainstem Haemorrhage (BH), Stroke (S).

Group-Based Psychological Interventions

Details of the group-based psychological interventions are shown in Table 2. In terms of intervention type, three of the eight included studies conducted an ACT group (Liu et al., 2023; Majumdar & Morris, 2019; Niu et al., 2022), and two studies incorporated mindfulness-based cognitive therapies either as a standalone therapy (Udvardi et al., 2024) or combined with solution-focused therapy (Xiong et al., 2025). Two studies combined cognitive behavioural components with a specifically designed fatigue management programme (Jones et al., 2025) and stress management programme (Yue et al., 2024), and one conducted reminiscence therapy (Yu et al., 2023).

While seven studies primarily aimed to improve mood (Liu et al., 2023; Majumdar & Morris, 2019; Niu et al., 2022; Udvardi et al., 2024; Xiong et al., 2025; Yu et al., 2023; Yue et al., 2024), intervention content (including education and skills) varied as summarised in Table 2. All interventions were delivered by a trained clinician of varying specialties across a range of settings including hospitals, community locations, and rehabilitation centres (Jones et al., 2025; Liu et al., 2023; Majumdar & Morris, 2019; Niu et al., 2022; Udvardi et al., 2024; Xiong et al., 2025; Yu et al., 2023). However, Yue et al. (2024) did not report where their intervention took place.

Session duration and frequency was mixed, ranging from 45 to 120-minute sessions delivered weekly or monthly, over four weeks to 12 months (Jones et al., 2025; Liu et al., 2023; Majumdar & Morris, 2019; Niu et al., 2022; Udvardi et al., 2024; Xiong et al., 2025; Yu et al., 2023; Yue et al., 2024). While three studies did not report the number of participants within each therapy group (Jones et al., 2025; Udvardi et al., 2024; Yu et al., 2023), remaining study group sizes ranged from 4.80 to 7.60 participants on average (Liu et al., 2023; Majumdar & Morris, 2019; Niu et al., 2022; Xiong et al., 2025; Yue et al., 2024).

In accordance with the inclusion criteria, all interventions were assessed against control groups, which (where reported) varied in content and structure from individual standard care, to group-based post-stroke education programmes (Jones et al., 2025; Liu et al., 2023; Majumdar & Morris, 2019; Niu et al., 2022; Udvardi et al., 2024; Xiong et al., 2025; Yu et al., 2023; Yue et al., 2024).

Collectively, this illustrates that even though three studies delivered ACT, and seven studies primarily aimed to improve symptoms of anxiety and depression, features of the interventions and the control groups varied greatly.

Table 2

Psychological Interventions and Control Group of Included Studies

Study	Psychological Intervention						Control
	Type	Content	Clinician	Group Size	Duration & Frequency	Setting	
Jones et al. (2025)	Fatigue Management (FM) Programme, based on traditional CBT	Week 1: introduction to fatigue Week 2: fatigue management Week 3: sleep/relaxation Week 4: exercise and nutrition Week 5: mood Week 6: future strategy use	Registered Clinical Psychologist trained in the program	NR	6 weeks; 60-90 minutes weekly	Community	Educational control (EC) group session (stroke and related topics including nutrition and exercise). Minimal focus on fatigue.
Liu et al. (2023)	Acceptance and Commitment Therapy (ACT)	Session 1: getting to know stroke Session 2: being content with the present Session 3: observe and understand yourself Session 4: aware of and embrace the present Session 5: values	2x nurses supervised by clinical psychologists	4-8	4 weeks; 1-2 sessions per week (7 total)	Large hospital with acute inpatient treatment.	Treatment as usual

		Session 6: goals and committing to action Session 7: relax and sleep					
Majumdar et al. (2019)	Acceptance and Commitment Therapy (ACT)	1: You are not your mind 2: facing up to life 3: being mindful 4: living wisely/well	2x of either clinical psychologists, assistant psychologists or stroke care co-ordinators	3-9	4 weeks; 2 hours weekly	Community	Treatment as usual
Niu et al. (2022)	Acceptance and Commitment Therapy (ACT)	1. Intro and mindfulness 2. creative hopelessness 3. acceptance and cognitive defusion 4. values 5. committed action	1x psychological therapist; 1x research assistant	4-6	5 weeks; 45-55 minutes (frequency not reported)	Hospital	Treatment as usual
Udvardi et al. (2024)	Mindfulness-based cognitive therapy (MBCT)	1: mindfulness, power of thinking 2: return to the present 3: recognising avoidance 4: acceptance 5: thoughts as mental events 6: kindness to ourselves 7: keeping mindfulness	Certified MBCT trainer	NR	6 weeks; 8x 1.5 hour sessions	Physiotherapy room on the ward	Treatment as usual

Xiong et al. (2025)	Solution-focused brief therapy combined with mindfulness-based cognitive therapy (SFBT MBCT)	Week 1: strength identification; Week 2: Goal setting; Week 3: Exception finding; Week 4: Goal planning; Week 5: Coping/Challenges; Week 6: Positive reframing; Week 7: goal review and adjustment; Week 8: future planning. Within session structure: 0–40m: MBCT core practices (Breathing Practice, body scan, thought observation training); 40–55m: SFBT techniques (scaling questions for coping confidence, miracle question exploration, future goal formulation); 55–60m: consolidation (homework assignment).	2x MBCT-certified nurses (mindfulness delivery); 1x psychologist (session documentation/support); 1x rehabilitation physician (safety oversight); 3x neurology nurses (session coordination); 1x graduate nursing student (data coordination)	5	8 weeks; 60 minutes weekly	2 weeks in hospital, 6 weeks online	Routine psychological nursing, 30 minutes weekly for 8 weeks. In person or via WeChat/telephone if discharged. Individual sessions, supplemented with group education during scheduled ward activities.

Yu et al. (2023)	Reminiscence Therapy (RT)	(a) introducing yourself/family; (b) childhood stories; (c) romantic story; (d) brave decisions; (e) favourite movies; (f) favourite places; (g) most memorable photos; (h) favourite books; (i) favourite celebrities; (j) hobbies; (k) experiences about the disease and achievements; (l) review, summary, and farewell.	Trained nurses	NR	1 year; 120 minutes, once per month (60 minutes RT, 60 minutes usual care)	Rehab centre post-discharge	Usual care with trained nurses, once per month for 1-year post-discharge (rehabilitation guidance, psychological counselling, self-monitoring, diet and lifestyle, matters needing attention, family education, and regular re-examination).
Yue et al. (2024)	Cognitive behavioural stress management (CBSM)	Cognitive education, skills education, relaxation training and emotional communication	2x trained nurses	8-10	3 months; 2 hour sessions, weekly	NR	Weekly routine care with nurses, 3 months post-discharge. 2 hr sessions of 8-10 patients.

											a) Education: 15 minutes of AIS manual and 15 minutes questions; b) Physical rehabilitation training: 60 minutes (swallowing, postural training, breathing training, standing and walking); c) Psychological rehabilitation training, 30 minutes (comfort and support)

Note: Intervention Type: Cognitive Behavioural Therapy (CBT); Intervention: Not Reported (NR).

Mood Outcomes

Anxiety and depression outcomes, including effect sizes are provided in Table 3. Seven of the eight studies aimed to improve mood as a primary outcome (Liu et al., 2023; Majumdar & Morris, 2019; Niu et al., 2022; Udvardi et al., 2024; Xiong et al., 2025; Yu et al., 2023; Yue et al., 2024); seven of these assessed depression and five assessed anxiety (Majumdar & Morris, 2019; Udvardi et al., 2024; Xiong et al., 2025; Yu et al., 2023; Yue et al., 2024). The eighth study, however, primarily assessed fatigue severity and its multidimensional domains (Jones et al., 2025).

Of the depression outcomes, three studies used the Hospital Anxiety and Depression Scale – Depression (HADS-D) (Jones et al., 2025; Yu et al., 2023; Yue et al., 2024), three used a version of the Hamilton Rating Scale of Depression (HAMD) (Liu et al., 2023; Niu et al., 2022; Xiong et al., 2025), one used the Patient Health Questionnaire 9 (PHQ-9) (Majumdar & Morris, 2019) and one used Beck's Depression Inventory (BDI) (Udvardi et al., 2024).Of the anxiety outcomes, three studies used the HADS anxiety scale (HADS-A) (Jones et al., 2025; Yu et al., 2023; Yue et al., 2024), one used the Hamilton Rating Scale of Anxiety (HAMA) (Xiong et al., 2025), one used the Generalised Anxiety Disorder 7 (GAD-7) (Majumdar & Morris, 2019) and one used the State Trait Anxiety Inventory X2 (STAI-X2) (Udvardi et al., 2024).

Six of the eight studies did not directly report effect sizes (Jones et al., 2025; Majumdar & Morris, 2019; Niu et al., 2022; Udvardi et al., 2024; Yu et al., 2023; Yue et al., 2024). Meanwhile, Xiong et al. (2025), reported very large effect sizes for anxiety (d = 1.45) and depression (d = 1.82) and (Liu et al., 2023) reported substantial differential change in depression over time (partial n^2 = .306).

Table 3

Outcome Measures and Results for Included Studies

Study	Intervention	Control	Outcome Measure		Results Immediately Post-Intervention					
			Anxiety	Depression	Intervention Anxiety M (SD)	Control Anxiety M (SD)	Effect Size	Intervention Depression M (SD)	Control Depression M (SD)	Effect Size
Jones et al. (2025)	Fatigue Management Programme	Educational control group	HADS-A*	HADS-D*	4.2 (0.5)	4.0 (0.5)	NR	4.5 (0.5)	4.2 (0.5)	NR
Liu et al. (2023)	ACT	Usual care	-	HAMD-24	-	-	-	5.69 (2.130)	10.72 (3.625)	Partial n^2 = .306
Majumdar et al. (2019)	ACT	Treatment as usual	GAD-7*	PHQ-9	6.42 (5.5)	6.37 (5.5)	NR	9.31 (6.7)	9.93 (7.0)	NR
Niu et al. (2022)	ACT	Usual care	-	HAMD	-	-	NR	5.46 (4.30)	5.95 (4.14)	NR

Udvardi et al. (2024)	MBCT	Standard care	STAI-X2	BDI	34.88 (9.27)	38.19 (9.50)	NR	5.23 (4.12)	8.24 (5.88)	NR
Xiong et al. (2025)	SFBT MBCT	Routine psychological nursing	HAMA*	HAMD-17	14.6 (4.3)	21.5 (6.0)	Cohen's d = 1.45	12.5 (3.5)	21.1(5.2)	Cohen's d = 1.82
Yu et al. (2023)	RT	Usual care	HADS-A	HADS-D	5.6 (2.7)	7.0 (4.3)	NR	5.7 (3.1)	6.8 (3.3)	NR
Yue et al. (2024)	CBSM	Routine care	HADS-A	HADS-D	5.9 (2.6)	7.1 (3.5)	NR	5.8 (2.5)	7.0 (2.8)	NR

Note: * (secondary outcome); Not Reported (NR); Outcome Measures: Hospital Anxiety and Depression Scale (HADS-A and HADS-D), Hamilton Rating Scale of Depression (HAMD), Patient Health Questionnaire 9 (PHQ-9), Beck's Depression Inventory (BDI), Hamilton Rating Scale of Anxiety (HAMA), Generalised Anxiety Disorder 7 (GAD-7) and State Trait Anxiety Inventory X2 (STAI-X2).

Risk of Bias Assessment

Table 4 outlines the RoB assessment for assignment to intervention. Domain-level assessments are provided, alongside an overall rating as per the Cochrane RoB-2 guidance (Sterne et al., 2019). For RCTs that had multiple outcomes (anxiety and depression), RoB did not differ, so these have been presented together. Appendix D provides a summary of responses to signalling questions.

Six studies showed an overall RoB rating of some concerns with an unpredictable direction of bias (Liu et al., 2023; Majumdar & Morris, 2019; Niu et al., 2022; Udvardi et al., 2024; Xiong et al., 2025; Yu et al., 2023). Jones et al. (2025) was low in RoB. Yue et al. (2024) was considered high in RoB with an overall predicted direction of bias favouring the experimental condition. Despite RoB being assessed as high for Yue et al. (2024), the study was not excluded from analyses. Instead, sensitivity analyses are performed to monitor the impact of this on pooled effect sizes.

Table 4

Risk of Bias Assessment Following Cochrane RoB-2 Guidelines

Study	Outcome	Domain 1: Randomisation	Domain 2: Deviations	Domain 3: Missing Outcome Data	Domain 4: Measurement of the Outcome	Domain 5: Selection of Reported Result	Overall Risk of Bias	Overall Predicted Direction of Bias
Jones et al. (2025)	A, D							NA
Liu et al. (2023)	D							Unpredictable
Majumdar et al. (2019)	A, D							Unpredictable
Niu et al. (2022)	D							Unpredictable
Udvardi et al. 2024)	A, D							Unpredictable
Xiong et al. (2025)	A, D							Unpredictable
Yu et al. (2023)	A, D							Unpredictable

Yue et al. (2024)	A, D							Favours Experimental

Note: Outcomes: Anxiety (A), Depression (D); Risk of Bias: low (green), some concern (yellow), high (red); Direction of bias: Not applicable (NA).

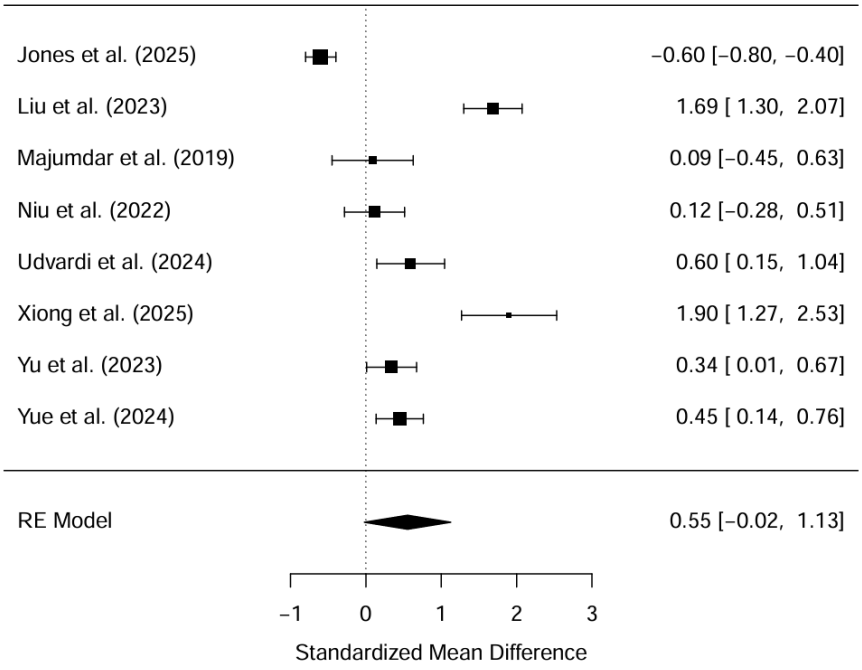
Meta Analysis

Depression

For all eight studies, the random effects meta-analysis demonstrates a moderate, and non-significant, pooled effect size (Hedges g = 0.55, 95% CI [-0.0192, 1.1262], z = 1.89, *p* = 0.0582). Substantial heterogeneity between studies was observed (*Q*(7) = 151.94, *p* = <0.0001, I^2 = 95.01%), indicating high variance across studies. Figure 3 provides a random effects forest plot illustrating each study's effect size and the variability in the magnitude and direction of these, whereby seven studies favour the experimental condition and one, the null condition.

Figure 3

Random effects forest plot of effect sizes for depression



Note: n = 8

Sensitivity analyses to ascertain the influence of Jones et al. (2025)'s fatigue intervention on the pooled effect size estimate due to a secondary aim of improving mood illustrate that when removed, there is a larger and statistically significant pooled effect (Hedges g = 0.73, 95% CI [0.19, 1.26], z = 2.66, *p* = 0.0078), though heterogeneity remained

substantial ($Q(6) = 58.62$, $p = <0.0001$, $I^2 = 91.54\%$). Appendix E, Figure E1 provides the random effects forest plot.

Additional sensitivity analyses were conducted to determine the influence of Yue et al. (2024) on the pooled effect size estimate due to its high risk of bias. However, due to the influence of Jones et al. (2025) on the outcome, sensitivity analyses were undertaken with this study also removed. When Yue et al. (2024) is excluded, a large, significant effect size is observed, where Hedges g = 0.78, 95% CI [0.15, 1.41], z = 2.41, $p = 0.0158$. However, heterogeneity remains high ($Q(5) = 56.73$, $p = <0.0001$, $I^2 = 92.05\%$). Appendix E, Figure E2 shows the random effects forest plot of effect sizes for the five studies included in this sensitivity analysis.

For both sensitivity analyses, confidence intervals overlap with the main analysis before study exclusions, indicating similar effect estimates. However, unlike the main analysis, confidence intervals from sensitivity analyses exclude zero, indicating a stronger effect when Jones et al. (2025) and Yue et al. (2024) are excluded.

Subgroup Meta-Analyses for Intervention Type for Depression. Due to the high heterogeneity that remains after Jones et al. (2025) and Yue et al. (2024) are excluded, a sub-group meta-analysis was conducted for intervention type.

For the three studies delivering ACT (Liu et al. (2023); Majumdar et al. (2019); Niu et al. (2022)), meta-analysis found that while the pooled effect size was moderate (Hedges g = 0.64, 95% CI [-0.4., 1.68], z = 1.20, $p = 0.2301$), this was non-significant and heterogeneity remained high ($Q(2) = 37.98$, $p = <0.0001$, $I^2 = 94.17\%$). Appendix E, Figure E3 shows the random effects forest plot of effect sizes for the three studies included in this sensitivity analysis.

Table 5 below provides a summary of meta-analyses, sensitivity analyses and sub-group analyses conducted for depression.

Table 5

Results from Meta and Sensitivity Analyses of Depression

		Pooled Effect Size					Heterogeneity			
			95% CI							
	k	*g*	LB	UB	z	*p*	Q	df	*p*	I^2
Overall	8	0.55	-0.0192	1.1262	1.89	0.0582	151.94	7	<0.0001***	95.01
Sensitivity Analysis										
Removal of Jones et al. (2025)	7	0.73	0.19	1.26	2.66	0.0078**	58.62	6	<0.0001***	91.54
Removal of Yue et al. (2024)	6	0.78	0.15	1.41	2.41	0.0158*	56.73	5	<0.0001***	92.05
Subgroup Analysis										
ACT interventions	3	0.64	-0.4	1.68	1.20	0.2301	37.98	2	<0.0001***	94.17

Note: Number of studies (*k*); 95% confidence intervals (95% CI); lower bound (LB) and upper bound (UB); * indicates significance at *p* = 0.05 level; ** indicates significance at *p* = 0.010 level; *** indicates significance at *p* = 0.001 level.

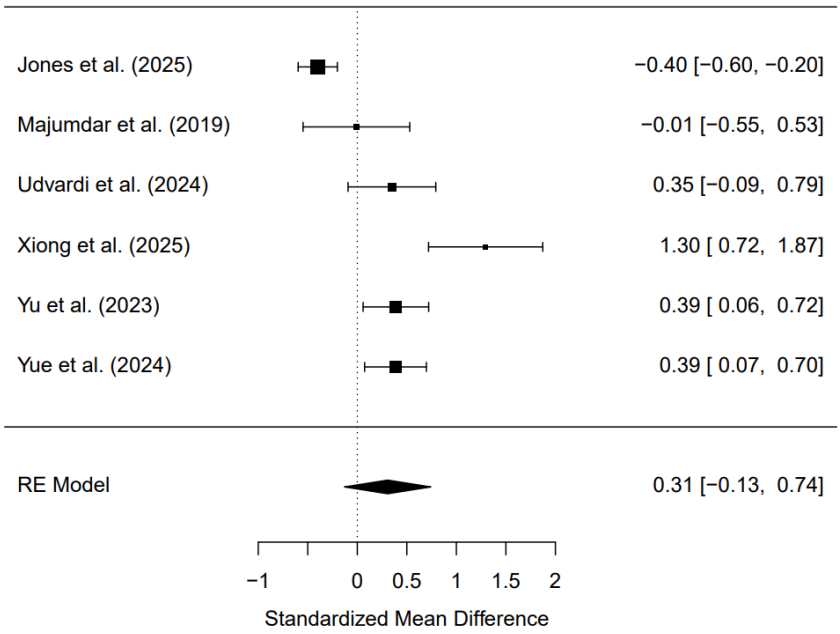
Anxiety

For all six studies assessing anxiety, the random effects meta-analysis demonstrates a small, non-significant, pooled effect size (Hedges *g* = 0.31, 95% CI [-0.1292, 0.7415], z = 1.38, *p* = 0.1682). Substantial heterogeneity between studies is observed (*Q*(5) = 48.02, *p* = <0.0001, I^2 = 88.77%), indicating high variance across studies.

Figure 4 provides a random effects forest plot illustrating each study's effect size and the variability in the magnitude and direction of these, whereby four studies favour the experimental condition and two, the null condition.

Figure 4

Random effects forest plot of effect sizes for anxiety



Note: n = 6

Sensitivity analyses were conducted to determine the influence of Jones et al. (2025) on the pooled effect size estimate, indicating a larger, but small and statistically significant pooled effect size (Hedges g = 0.46, 95% CI [0.1032, 0.8170], z = 2.53, p = 0.0115). However, heterogeneity remained substantial (Q(4) = 11.48, p = 0.0217, I^2 = 72.21%). Appendix F, Figure F1 shows the random effects forest plot of effect sizes for the five studies included in this sensitivity analysis.

Further sensitivity analysis was conducted to determine the influence of Yue et al. (2024) on the pooled effect size estimate due to its high risk of bias. As sensitivity analyses revealed that the study by Jones et al. (2025) impacts the significance of the pooled effect size, sensitivity analyses were undertaken with this study removed. Therefore, when Yue et al. (2024) is also excluded, a small and non-significant effect size is observed (Hedges g = 0.49, 95% CI [-0.0108, 0.9915], z = 1.92, p = 0.0551). Heterogeneity also remains substantial (Q(3) = 11.38, p = 0.0098, I^2 = 78.91%). Appendix F, Figure F2 shows the random effects forest plot of effect sizes for the four studies included in this sensitivity analysis.

For both sensitivity analyses, confidence intervals overlap with the main analysis before study exclusions, indicating similar effect estimates. When excluding Jones et al.

(2025), confidence intervals shift above zero, indicating that a stronger effect exists when primary aims are to target mood. When also excluding Yue et al. (2024) confidence intervals continued to overlap with zero, but the direction of the effect remained the same as the main analysis for anxiety.

Table 6 below provides a summary of meta-analyses, sensitivity analyses and sub-group analyses conducted for depression.

Table 6

Results from Meta and Sensitivity Analyses of Anxiety

			95% CI							
	k	*g*	LB	UB	z	*p*	Q	df	*p*	I^2
Overall	6	0.31	-0.1292	0.7415	1.38	0.1682	48.02	5	<0.0001	88.77
Sensitivity Analysis										
Removal of Jones et al. (2025)	5	0.46	0.1032	0.8170	2.53	0.0115	11.48	4	0.0217	72.21
Removal of Yue et al. (2024)	4	0.49	-0.0108	0.9915	1.92	0.0551	11.38	3	0.0098	78.91

Note: Number of studies (*k*); 95% confidence intervals (95% CI); lower bound (LB) and upper bound (UB).

Certainty of Evidence – GRADE

For both depression and anxiety outcomes, certainty of evidence was rated very low, with individual assessments yielding the same scoring. Table 7 summarises GRADE rankings.

Certainty was downgraded for all categories, except indirectness, which left certainty unchanged due to the available evidence (population, intervention, comparator, and outcome) addressing the research question; and publication bias which was not graded due to the limited number of included studies impacting the reliability of funnel plots. Justifications for downgrades are summarised below.

Downgrades

Certainty was downgraded one level for RoB assessments due to overall ratings of some concerns using the Cochrane RoB-2 tool. Biases predominantly arose in relation to the handling and reporting of missing data, participant dropouts, blinding and pre-specified analysis plans.

Inconsistencies were assessed through visual inspection of random effects forest plots, and the I-squared statistic. Certainty was therefore downgraded two levels as heterogeneity was ranked as substantial (I = 92.05% and 78.91%).

Imprecision was downgraded two levels due to fewer than 400 participants per group and 95% confidence intervals ranging from no effect to large effect.

Table 7

Summary of Certainty of Evidence Using GRADE

Outcome	Number of Studies	Participants (Experimental : Control)	Risk of Bias	Inconsistency	Indirectness	Imprecision	Publication Bias	Certainty (GRADE)	Effect Estimate
Depression	6	288 : 280	-1	-2	0	-2	-	Very low	0.78, 95% CI [0.015, 1.41]
Anxiety	4	168 : 163	-1	-2	0	-2	-	Very low	0.49, 95% CI [-0.0108, 0.9915]

Note: -2 = downgrade two levels, -1 = downgrade one level, 0 = no downgrade or upgrade, +1 = upgrade one level, +2 = upgrade 2 levels, '-' indicates not assessed. Levels of certainty are high, moderate, low and very low. RCTs start as high GRADE.

Discussion

This systematic review and meta-analysis assessed whether group-based psychological interventions are effective in improving mood (anxiety and depression) post-stroke to support the development of psychological therapies available for stroke survivors.

Overall, eight studies met inclusion criteria. Some concern for risk of bias was found for six studies, while one study had low and another had high concern using the Revised Cochrane RoB-2 tool. For both anxiety and depression, substantial heterogeneity and very low certainty of evidence (using the GRADE approach) was established. Findings should therefore be interpreted cautiously, with additional caution required for analyses of anxiety due to the smaller number of studies included. Sensitivity analyses that excluded studies not primarily aiming to target mood or with high risk of bias, suggested that group-based psychological interventions have a significant moderate positive effect on symptoms of depression. For anxiety, preliminary evidence from sensitivity analyses suggests a smaller positive effect, although the effects were not significant.

Substantial heterogeneity is explained by variation in participant characteristics, outcome measures, intervention content (including education and skills), session duration and frequency, group sizes, presence of clinical professionals and location of delivery. This limits the extent to which conclusions can be drawn and, alongside sensitivity analyses, demonstrates the influence of individual studies on effect size and significance, indicating the importance of intervention specificity and features on intervention efficacy.

Equally, stroke is a chronic disease requiring regular health reviews within the first six months followed by annual check-ups in the longer term (NG236, (NICE, 2023)). Research has found that those who have a higher number of hospital admissions or chronic health condition, experience higher health-related anxiety (Gedik et al., 2023). For such anxiety, psychological interventions that provide psychoeducation to understand emotions and body sensations, and target unhelpful health-related anxiety behaviours are recommended (Hedman-Lagerlöf & Axelsson, 2019). These features were not reported in the studies included in this meta-analysis, so heterogeneity may also reflect variation in how interventions are tailored to stroke-related challenges.

A further sub-group analysis for intervention type was conducted for outcomes of depression but not anxiety due to the limited number of studies measuring anxiety. Three studies used ACT (Liu et al., 2023; Majumdar & Morris, 2019; Niu et al., 2022), so these were analysed together, finding a non-significant moderate effect on depression. As above, this could be explained by the small number of studies assessed and substantial heterogeneity in intervention content, length, duration and frequency, despite use of the same underlying framework (ACT). However, the primary aim of ACT is not to alter distress or mood (Hayes et al., 2006), but rather to increase psychological flexibility (the ability to live in line with our values despite distress) (Doorley et al., 2020; Harris, 2019). It is therefore possible that group-based ACT may be effective in improving other aspects of a person's wellbeing, further explaining the finding of this analysis.

Importantly, study sample characteristics may impact the interpretation of findings. With most studies being undertaken in China and fewer in Western healthcare contexts, cross-cultural applications of findings are limited. Outcomes may be influenced by cultural differences in perceptions of mental health, wellbeing, psychological distress, help-seeking behaviours, and the ways in which emotional difficulties are reported (Ryder et al., 2008). Equally, a predominantly male sample in both intervention and control groups further affects the interpretation of findings. Differences in how males and females disclose challenges with their mental health are documented (Seidler et al., 2016). This may therefore impact responses to self-report measures, resulting in differences in outcomes. Lastly, participant's time since stroke may further impact interpretation of this meta-analysis as engagement in and setting of rehabilitation goals may differ during each stage of recovery (Laver et al., 2010), with timing of psychological therapy impacting outcome (Suh et al., 2025). However, the absence of reporting on participants' time post-stroke means the present meta-analysis cannot ascertain whether this may have influenced the outcome of group-based therapies post-stroke. Future research could address these issues by recruiting diverse populations with consideration for cultural adaptations to support intervention efficacy, comparing outcomes across culture and gender to understand acceptability of interventions across populations and routinely reporting participant's time post-stroke alongside raw data.

Collectively, despite the small nature of this systematic review and meta-analysis, findings are in line with previous reviews assessing the efficacy of group-based psychological

interventions on mood for those with other neurological conditions. For example, a review on therapy groups for multiple sclerosis found improvements for depression, but smaller changes for anxiety (Firth, 2014), while another meta-analysis found a small positive effect on psychosocial outcomes for those with acquired brain injury (McGlashan et al., 2025). Both reviews comment on the heterogeneity of included studies limiting the comparisons and conclusions that can be made for intervention efficacy. This indicates a potentially broader implication for psychological research across neurological conditions.

Limitations

There are several limitations of the overall meta-analysis and included studies that should be considered.

Firstly, a small number of studies met inclusion criteria, reflecting the nascent nature of the evidence base. This limits the reliability of pooled effect estimates, which was further amplified by the substantial heterogeneity found in meta-analyses of both depression and anxiety. The small number of included studies also meant publication bias could not be reliably assessed using funnel plots as per Cochrane recommendations (Page et al., 2024). Consequently, the completeness of data within this meta-analysis cannot be established, limiting the conclusions that can be drawn. The use of ascendency and descendency approaches as part of the search strategy may have identified further eligible studies, improving the completeness of data. Such approaches should therefore be considered in future meta-analyses.

Moreover, of the eight studies, RoB assessments revealed six were of some concern, and one was of high concern. Concerns mostly arose due to a lack of reporting on whether analyses followed pre-specified plans and study protocols not being available. Five of the eight studies also had more than 5% dropout rates and did not adjust for this in the analysis. Many of the dropouts were categorised as lost to follow-up, meaning dropout reasons could not be ascertained, further increasing the risk of missing data impacting the outcome. Moreover, while psychological intervention research often faces challenges with participant blinding (Juul et al., 2021; Page & Persch, 2013), participant blinding of aims, group allocation and outcome assessment either did not occur or was not reported, further increasing the risk of bias for included studies. Collectively, this reduces the confidence in

the findings and conclusions of this review. A synthesis of qualitative, mixed method or non-randomised, practice-based study designs alongside the meta-analysis may have improved interpretation of intervention efficacy and application of findings across clinical contexts.

Implications and Future Research

The recommendations for future research discussed below are summarised in a list in Appendix G. Further investigation into group-based psychological interventions for post-stroke mood is required given the small number of studies identified in this review. A particular focus on replicating and improving the methodological quality of existing studies should be prioritised, while ensuring consistent follow-up periods. This should be approached by ensuring studies are adequately powered with larger sample sizes and using follow-up periods such as two and three months, in line with the current evidence base identified in this systematic review. Collectively, this will improve the precision of pooled effect estimates in future meta-analyses and enable assessment of longevity of change for insight into long-term intervention effectiveness and optimising patient experiences across healthcare services (Wojner & MacCutcheon, 1998).

Once more research of high methodological quality has been conducted, future research can begin to address the feasibility of interventions and how they can be implemented into clinical services. This may include consideration of factors such as local service contexts and referral pathways, intervention resources/materials required, clinician training necessary for effective delivery and accessibility for clients. Interventions placing high demands on services may not be practical long-term, so research must ensure approaches can be applied within service constraints.

Additionally, given the imbalance in the number of studies assessing depression and anxiety, and the comorbid nature of these disorders (Chun et al., 2022; Rafsten et al., 2018; Sagen et al., 2009; Stein et al., 2018), future research should monitor both outcomes together when assessing the efficacy of group-based psychological interventions post-stroke. This is important because psychological interventions are often transdiagnostic in nature as they target mechanisms that underly both anxiety and depression, including emotional dysregulation, and maladaptive cognitions or behaviours (Clark, 2009; Cuijpers et al., 2023). Not only will this enable increased opportunity for between-study comparisons and a

greater evidence base, but it may also enable greater clinical utility of interventions for treating post-stroke emotional difficulties.

In the longer term, once there is sufficient evidence for effective group-based psychological interventions for post-stroke mood, research should compare such interventions against individualised (1:1) therapy and across delivery modalities (in-person versus teleconferencing). This will enable cost-benefit analyses of group versus individual therapy at a service and patient level, as well as further assessment and understanding of underlying mechanisms contributing to post-stroke mood. Equally, such assessments may allow identification of sub-groups who are more likely to benefit from one intervention over another, having implications on service planning, resource allocation, and clinical decision making. When identifying sub-groups benefiting from each psychological therapy, researchers may wish to consider characteristics associated with health inequalities, including older adults due to the risk of stroke increasing exponentially with age (Truelsen et al., 2006), those residing in rural/coastal communities where access to healthcare may be more of a challenge (All-Party Parliamentary Group, 2022) contributing to worse mental health outcomes (Environment Food and Rural Affairs Committee, 2023), and ethnic minorities who face additional barriers to accessing healthcare and poorer post-therapy outcomes compared to their white counterparts (Bamrah et al., 2025).

Summary

Overall, due to substantial heterogeneity and concern for risk of bias, there is very low certainty as to whether group-based psychological therapies improve mood (depression and/or anxiety) post-stroke. Future research should address the limitations identified in this review by replicating existing studies with improved methodological quality and reporting, and by assessing anxiety and depression together for improved between study comparisons and clinical utility. In the long term, comparing group-based and individual psychological therapies across varying delivery modalities (in-person versus teleconferencing) for post-stroke mood, with consideration to various demographics that impact access to and outcome of healthcare services and therapies, will enable further understanding of their efficacy and have greater implications for service planning, resource allocation and clinical decision making.

Disclosure of Interest

The authors report no conflict of interest.

Data Availability Statement

Data extracted and analysed are presented in the summary tables and figures of this report. A summary table of the Cochrane RoB-2 tool is provided in Appendix D, Table D1.

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Chapter 3: Bridging Chapter

The systematic review in Chapter 2 assessed whether group-based psychological interventions are effective in improving post-stroke anxiety and depression. Due to the substantial heterogeneity, concern for risk of bias, small pooled sample size and inability to assess publication bias, there is very low certainty on whether group-based psychological interventions impact mood. The systematic review therefore highlights the need for further investigation into group-based psychological interventions for stroke survivors.

Of the eight studies included in the review, three delivered an ACT-based intervention, so a sub-group analysis was conducted, finding a moderate (though non-significant) effect on depression. The aim of ACT is to promote psychological flexibility, referring to the ability to live in line with one's values despite adversity or distress (Doorley et al., 2020; Harris, 2019), as opposed to directly targeting mood or distress itself (Hayes et al., 2006). Beyond the methodological limitations of studies included in the meta-analysis, this may partially explain why a non-significant effect of depression is observed. To assess the true efficacy of ACT as a group-based intervention post-stroke, it is therefore important to monitor change in the underlying constructs of ACT, alongside mood or distress, to determine whether the intervention achieves its primary purpose.

Moreover, none of the studies included in the systematic review and meta-analysis presented in Chapter 2 delivered psychological therapy via telerehabilitation, despite the shift in healthcare delivery to online teleconferencing methods post-Covid (Weinberg, 2021). As a result, ongoing challenges for the application of psychological research to real-life settings persist with limited insight into the acceptability and feasibility of online methods of delivery. Further research is therefore required to assess the effectiveness of online groups across diverse populations and presenting difficulties (Weinberg, 2020).

Chapter 4 therefore continues to explore the current research of ACT and online group-based therapies post-stroke, with the primary aim to assess whether group-based ACT delivered via telerehabilitation shows preliminary evidence of increasing psychological flexibility post-stroke, with consideration for distress, quality of life, participation, and wellbeing. Feasibility and acceptability are assessed to support real-world application of the intervention in healthcare settings.

Chapter 4: Empirical Study

Acceptance and Commitment Therapy Group for Post-Stroke Adjustment via Telerehabilitation: A Single Case Experimental Design

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Word Count (including abstract and references, excluding tables and figures): 11,626

Prepared for submission to Journal of NeuroRehabilitation (guidelines presented in Appendix H).

Statements and Declarations

Ethical Considerations

Ethical approval [Reference: 25/SC/0156] was obtained by the NHS Health Research Authority and Health and Care Research Wales following a review by the Research Ethics Committee, on 23rd June 2025.

Consent to Participate

Written informed consent to participate was obtained from all participants.

Consent for Publication

Not applicable.

Declaration of Conflicting Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding Statement

This research did not receive a grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data Availability

Data is not publicly available due to ethical and confidentiality restrictions.

Abstract

Background: Difficulty adjusting after stroke is common. Acceptance and Commitment Therapy (ACT) is recommended, though findings are mixed and ACT processes, namely psychological flexibility (PF), are not consistently monitored. ACT delivered as an online group may alleviate NHS pressures while increasing access to psychological care post-stroke. This study assessed the preliminary efficacy of an ACT group delivered via telerehabilitation on indicators of post-stroke adjustment, with consideration of feasibility and acceptability.

Methods: A concurrent multiple baseline single-case experimental design with five adult stroke survivors attending an eight-week online ACT group. PF was monitored weekly at baseline (five to seven weeks) and during the eight-week intervention. Pre- and post-assessments included PF, distress, quality of life, independence, and wellbeing, together indicating adjustment. Feasibility and acceptability assessed using criteria based on existing post-stroke research.

Results: Preliminary findings were mixed. Visual analyses indicated no base effect of the intervention on PF. Intervention effects on PF were moderate-to-large for three participants. Increasing intervention trends indicated a cumulative effect of the online ACT group on PF. Where reliable change is observed in PF, distress, and wellbeing, some clinically significant changes were found, but patterns were mixed across participants. No reliable or clinically significant change was observed for independence. Preliminary assessment indicated the intervention may be feasible for pilot clinical trials. Core aspects of acceptability were supported.

Conclusion: Further research is required to understand the effect of an online ACT group on underlying mechanisms of post-stroke adjustment. Limitations, implications and suggestions for future directions are discussed.

Key Words: Stroke, Acceptance and Commitment Therapy, ACT, Group Therapy, Psychological Flexibility, Wellbeing, and Adjustment.

Introduction

Stroke often has a significant and lasting impact on activities of daily living (Hilari, 2011; Lazar & Boehme, 2017), relationships (Ford et al., 2022; Vickers, 2010), work (La Torre et al., 2022), sleep (Cai et al., 2021; Khot & Morgenstern, 2019) and mental health (Hilari, 2011; Knapp et al., 2020; Mitchell et al., 2017). Consequently, it is natural for stroke survivors to experience difficulty with psychological adjustment. Psychological adjustment to chronic illness refers to an ability to adapt to new life circumstances, encapsulating wellbeing and participation for restoring a sense of meaning (including values) and identity (Donnellan et al., 2012; Pamich, 2006; Taylor, 1983). Several models of adjustment in acquired brain injuries (ABI) have been proposed (Y-Shaped Model (Gracey et al., 2009), Life Threads Model (Ellis-Hill et al., 2008), Social Cognitive Transition Model for Stroke (Taylor et al., 2011)), emphasising a complex dynamic, and non-linear process, of identity, roles, relationships, distress, coping, and illness/disability beliefs. As adjustment is multidimensional, a variety of outcome measures are often used to capture each of its domains in post-stroke research (Harrison et al., 2013).

When adjusting after stroke, many often remain focused on returning to their previous life and level of functioning (Jones et al., 2008; Mahmoud & Elaziz, 2016). While this can act as a motivator for functional improvement, it can interfere with rehabilitation (Mahmoud & Elaziz, 2016). Difficulty adjusting can instil doubt for the future (Carlsson et al., 2009), negatively affecting an individual's quality of life (QoL) (Bays, 2001; Jeong et al., 2012).

Given these challenges, stroke survivors have identified a need for improvements to mental health services (Weerasekara et al., 2021) and psychological support as their emotional needs are not being met (Stroke Association, 2014, 2022). Psychological interventions for wellbeing and adjustment have therefore been placed in the top 10 priorities for stroke rehabilitation research (James Lind Alliance, n.d.; Stroke Association, 2021). NICE (2023b) Guidelines for Psychological Functioning in Stroke Rehabilitation outline that clinicians should monitor emotional functioning and behaviour when assessing how individuals are adjusting and coping.

Acceptance and Commitment Therapy (ACT) has received increasing interest in the adjustment literature in recent years (Patchwood et al., 2024; Sathananthan et al., 2025). Proponents suggest that ACT is theoretically aligned with processes supporting adjustment (Hayes et al., 2011) and is recommended for those at risk of anxiety and depression post-stroke (National Clinical Guideline for Stroke, 2023).

Acceptance and Commitment Therapy

ACT is a psychological intervention (Harris, 2019; McHugh, 2011) targeting a person's relationship with distress, rather than aiming to change the distress itself as seen in more cognitive-based approaches (Hayes et al., 2006). It regards distress as a normal part of life due to the inevitability of adversity, which can prevent valued living and progression towards personal goals (Harris, 2019). ACT adopts a 'Hexaflex' model of psychological flexibility (PF; the ability to live in line with personal values despite distress) (Doorley et al., 2020; Harris, 2019) and consists of six components (acceptance, values, contacting the present, committed action, self-as-context, and defusion) (Bond et al., 2015). The model conceptualises mental health difficulties as an attempt to suppress unwanted thoughts and feelings (experiential avoidance), so proposes that by enhancing PF, we can instead create room for these and pursue a more meaningful life (Hayes et al., 2011). PF is considered a key process of psychological adjustment post-stroke (Cole, 2025), in turn improving wellbeing, QoL and social functioning, and reducing distress (Ong et al., 2024).

Alternative cognitive therapies are available which focus on treating and controlling distress (Hayes et al., 2006) by teaching clients to challenge their thoughts (Graham et al., 2015). However, difficulties post-stroke are often persistent and enduring (Crichton et al., 2016). ACT may therefore be more appropriate for supporting adjustment post-stroke as it promotes wellbeing and allows unwanted internal experiences, rather than removing, changing or resisting them (Majumdar & Morris, 2019). This approach provides structure for committing to value-based goals despite the pervasive challenges post-stroke (Majumdar & Morris, 2019).

ACT supports individuals to cope with and navigate this uncertainty using mindfulness, experiential exercises, and metaphors that can be applied to everyday life (Harris, 2006). It has shown efficacy in promoting wellbeing in adults living with long-term

health conditions such as chronic pain (Hughes et al., 2017), brain injury (Sander et al., 2021) and multiple sclerosis (Han, 2021). Meta-analyses also found significant moderate-to-large effects of ACT for physical health conditions on QoL and symptoms of depression (Konstantinou et al., 2023) and small-to-moderate effects of ACT for mental health and somatic health difficulties on primary outcomes, QoL and life satisfaction measures (A-Tjak et al., 2015).

It is a preferred intervention for addressing distress following ABI, helping individuals accept new personal challenges and move forward with their life despite uncertainty (Kangas & McDonald, 2011).

ACT in Stroke

There is growing evidence from case studies, single-case experimental designs (SCED) and randomised controlled trials (RCT) that ACT delivered face-to-face as a 1:1 or bibliotherapy intervention post-stroke leads to improvements in anxiety, depression, stress (Graham et al., 2015; Rauwenhoff et al., 2023) and QoL (Rauwenhoff et al., 2023). However, there are mixed findings of PF, and value-driven behaviour (Rauwenhoff et al., 2023; Sathananthan et al., 2025) with changes in PF not always coinciding with mood outcomes (Rauwenhoff et al., 2023). This may be explained by study samples combining ABI populations (stroke and traumatic brain injury) despite differences in aetiology and prognosis (Goldman et al., 2022). Importantly, the circumstances in which neurological conditions occur, such as through a vascular event (like in stroke) or external traumatic event (like in TBI) (Barker et al., 2018), may shape how an individual understands their injury and therefore how they make sense of and adapt to a new way of living. Cognitive difficulties following stroke, such as difficulties with attention, memory and executive functioning (El Husseini et al., 2023) may also impact an individual's capacity to engage in processes of PF, such as adapting behaviour and shifting perspective (Kashdan & Rottenburg, 2010). This could potentially influence the trajectory and nature of PF, making it necessary to consider neurological populations separately to better understand this. Equally, the format of individual (as opposed to group) therapy may explain these mixed findings as social participation is a central component of post-stroke recovery (Zhang et al., 2026) that is more strongly provided in group therapy contexts (Yalom & Leszcz, 2020). The research in this field

is therefore still emerging, and the extent to which ACT reduces distress post-stroke is not yet established (Graham et al., 2015).

To support advancement in our understanding of the efficacy of ACT and stroke rehabilitation, research must be undertaken with real-world clinical settings to facilitate the application of findings and increase accessibility (Blake et al., 2024; James Lind Alliance, n.d.). Research shows there are long waiting lists for psychological interventions (NHS England, 2022; Royal College of Physicians, 2015) and that psychologist staffing levels are half the recommended number within stroke units (Gittins et al., 2020), limiting timely access to psychological therapies post-stroke. Group-based psychological therapies may therefore offer a more feasible solution than individual therapy while providing additional benefits of peer support for stroke survivors (NICE, 2023b).

Preliminary efficacy of an ACT group on mood and distress in those with ABI has been assessed. RCTs and SCEDs involved four to eight weekly sessions (up to two hours) delivered face-to-face in a local NHS clinic or university (Majumdar & Morris, 2019; Sathananthan et al., 2022; Sathananthan et al., 2025). The preliminary evidence appears promising with improvements in distress, anxiety, depression, self-reported health status and hopefulness noted. However, as with 1:1 delivered ACT, some mixed findings are reported with no change in valued living scores immediately after the intervention (Sathananthan et al., 2022). This may reflect the slow functional progress post-ABI that is required to do the things that matter, emphasising a need for long-term follow up support to promote behaviour change (Sathananthan et al., 2022; Sathananthan et al., 2024). Nevertheless, participant feedback from an RCT suggested an ACT group helps those experiencing psychological distress when adjusting post-stroke, leading to modifications in the intervention that are yet to be empirically assessed (Large et al., 2019). The recommended modifications for ACT groups after stroke included a review of font size and formatting, incorporating personal examples to support understanding, using a multitude of teaching methods to meet individual learning needs, the inclusion of breaks as required, modifying the environment where possible (including lighting, temperature and noise) and offering session handout summaries and session agendas to reduce the impact of cognitive difficulties (Large et al., 2019).

In line with the current evidence base of ACT in stroke, factors of wellbeing and functioning are often used as indicators of adjustment in chronic health (Dekker & de Groot, 2018). However, ACT research focuses on “symptoms, syndromes and deficits”, which indicate psychological inflexibility rather than the benefits of psychological flexibility such as QoL and participation, aligning more with a model of distress than ACT (Doorley et al., 2020, p. 2). PF is associated with better psychological adjustment (Cole, 2025), so it is important that wellbeing and its links to acceptance are monitored throughout psychological interventions (Lander, 2009; Simione et al., 2021; Townend et al., 2010). In turn, the extent to which ACT achieves its primary aim in supporting stroke survivors to accept and adjust to their circumstances and whether changes to PF act as a plausible mechanism for improvements in mood can be assessed.

Telerehabilitation

In addition to the benefits of ACT and group interventions in the NHS, NICE (2023b) Guidelines recommend post-stroke healthcare uses telerehabilitation (rehabilitation provided through telephone, videoconferencing and web-based technologies (Brennan et al., 2009; Signal et al., 2020)). Telerehabilitation improves accessibility of healthcare for those who cannot easily travel or access private/public transport (Ostrowska et al., 2021) promoting healthcare equity (Wang et al., 2025). This is important given the risk of stroke increasing with age (Truelsen et al., 2006) as older adults are more likely to have disabilities (Coleman, 2023) and/or live in rural or coastal areas far from healthcare services (Office for National Statistics, 2022). Despite its benefits, challenges for accessibility may still pertain if assumptions are made regarding digital literacy and device access, given the prevalence of digital poverty and exclusion, particularly amongst older adults and those with disabilities (House of Lords Communications and Digital Committee, 2023).

Initial case study research into the efficacy of ACT via telerehabilitation found that six sessions improved psychological distress, depression, and PF across six months (Ooi & Steverson, 2023). A recent feasibility trial of an online ACT group also found this format to be “safe and feasible” for stroke survivors with some improvements in depression described (Patchwood et al., 2024). Given these findings, and a recent Cochrane review emphasising a need for more research into the efficacy of psychological therapy via telerehabilitation post-

stroke (Laver et al., 2020), further exploration into the efficacy of ACT-based telerehabilitation for adjusting to life post-stroke is required.

Aims

The primary aim of this study is to assess the preliminary efficacy of an adapted eight-week online group of acceptance and commitment therapy, as developed by Large et al. (2021), for post-stroke adjustment, indicated by changes in PF and pre-post indicators of psychological adjustment.

Finally, given the preliminary assessment of the intervention, the second aim is to explore the feasibility and acceptability of this online group intervention to inform future pilot clinical trials.

Methods

Design

A concurrent multiple baseline SCED (AB design) was conducted to assess whether group-based ACT via telerehabilitation can increase stroke survivor's PF and reduce distress. Baseline lengths of five, six or seven weeks were randomly allocated using a random number generator (Urbaniak & Plous, 2013). The nature of the intervention meant investigator and participant blinding was not possible. The Single-Case Reporting Guideline In BEhavioural (SCRIBE) Interventions was followed (Tate et al., 2016). See Appendix I for SCRIBE checklist.

A SCED was chosen as psychological adjustment is not linear (Ellis-Hill et al., 2008; Gracey et al., 2009; Taylor et al., 2011), and the design allows for longitudinal monitoring of stability in scores to improve confidence that changes observed are due to ACT and not other factors, evidencing "a potential treatment effect" (Slocum et al., 2022, p. 622). Equally, the repeated measurement of the outcome in SCED, unlike in pre-post designs, means causal inferences can be made (Kratochwill & Levin, 2010) and the multiple baseline design improves the validity and reliability of outcomes (Bouwmeester & Jongerling, 2020).

Participants

Eligibility criteria is provided in Table 1. Five participants were recruited following advertisement via NHS stroke services, the United Kingdom and Ireland Stroke Psychologist Network (UKISPN) mail list and Facebook groups for stroke survivors. The male to female

ratio was 2:3. Participants' mean age was 53.4 years (range = 44-60 years) and mean time since stroke was 17 months. All participants resided in the UK. Mean CORE-10 (Clinical Outcomes in Routine Evaluations 10) score across participants at recruitment was 18 (*SD* = 7.91). Participant demographics summarised in Table 2.

Table 1

Eligibility Criteria

Criteria	Details
Inclusion	• Over 18 years. • Stroke >3 months ago. • No other neurological illness. • Not currently receiving any psychological intervention. • No severe communication or cognitive difficulties. • No current or recent suicidal ideation or self-harming behaviours. • Not diagnosed with another major long-term health condition in the 12 months prior to the study starting.
Exclusion	• Not currently experiencing clinically relevant distress (indicated by a score of less than 10 on the CORE-10). • Not finding it difficult to adjust to life after stroke*. Established through conversations on how the stroke impacts participants day-to-day.

Note: * No difficulties adjusting were indicated by no new reported difficulties with relationships, participation in work or hobbies, independence, activities of daily living, and sense of self following the stroke. This was determined through conversation via video call following sign-up to the study to support confirmation of eligibility.

Table 2

Participant Demographics

Participant	Age (years)	Gender	Time Since Stroke (months)	CORE-10 Score Before Study Commencement
1	44	Female	17	29
2	56	Male	6	10
3	60	Male	38	12
4	48	Female	21	23
5	59	Female	3	16

Note: Comorbidities reported included long Covid and a septal defect; One participant reported prescribed medication of 150mg sertraline; post-stroke difficulties reported included visual impairments, upper and lower limb impairments, communication difficulties, and memory difficulties.

Measures

Weekly Measurement

To explore the mechanistic effect of psychological flexibility on indicators of adjustment, flexibility was measured at regular intervals in keeping with SCED methodology (Bouwmeester & Jongerling, 2020). The Comprehensive Assessment of Acceptance and Commitment Therapy Processes 10 (CompACT-10) was selected as an indicator of psychological flexibility.

The CompACT-10 is a 10-item questionnaire assessing PF (Francis et al., 2016) based on "three dyadic ACT processes" of openness to experience (OE), behavioural awareness (BA), and valued action (VA) (Golijani-Moghaddam et al., 2023, p. 60). Each item has a seven-point scale from strongly agree to strongly disagree (Golijani-Moghaddam et al., 2023). Higher scores indicate greater PF (Golijani-Moghaddam et al., 2023). The CompACT-10 has acceptable to excellent internal consistency (Cronbach's alpha, α, "total = 0.81, OE = 0.70, BA = 0.79, and VA = 0.75"), test-retest reliability (intraclass correlations, ICC, total = 0.83; OE = 0.86; BA = 0.76; VA = 0.89), convergent validity with the acceptance and action questionnaire-II (rs = -0.65 and -0.70) and concurrent validity with measures of wellbeing (rs = 0.66 and 0.67) amongst UK-representative samples (Golijani-Moghaddam et al., 2023, p. 64).

Pre-Post Indicators of Adjustment

Additional measures were chosen based on the secondary gains of ACT and common indicators of adjustment in chronic health research to support assessment of intervention efficacy.

CORE-10. The CORE-10 is a 10-item measure assessing psychological distress, covering several domains including anxiety, low mood, and social functioning (Barkham et al., 2013). Higher scores indicate greater distress (total 40) (Barkham et al., 2013). Cut-offs of 11 and 13 are reported for overall distress and depression respectively (Barkham et al., 2013).

The CORE-10 is validated in primary care mental health settings, with high internal reliability (α = 0.90) and convergent validity with the 34-item version (CORE-OM, r = 0.94)

(Barkham et al., 2013). Amongst post-acute stroke samples, the CORE-10 has high internal consistency (α = 0.8) and test-retest reliability (ICC = 0.81) (Steverson et al., 2024). In stroke it has a reliable change index of nine and clinical cut-score of 12 (Steverson et al., 2024).

Community Integrated Questionnaire 15 (CIQ-15). The CIQ-15 assesses participation across three subscales: home and social integration and productivity (Wilier et al., 1994). Higher scores indicating greater independence for activities such as managing finances, housework, employment/volunteering and socialising (Dalemans et al., 2010).

Test-retest reliability is high (ICC = 0.997) amongst geriatric populations (Singh & Sharma, 2015). Internal consistency (α = 0.71 – 0.84) and test-retest reliability (ICC = 0.96) are also considered good amongst adults with neurological conditions (Turcotte et al., 2019) and stroke survivors with mild-severe aphasia (Dalemans et al., 2010; Lee et al., 2015; Matos et al., 2020; Sathananthan et al., 2022).

Stroke-Specific Quality of Life (SSQoL-12). The 12-item SS-QoL considers domains of self-care, mobility, upper extremity, language, vision, thinking, work/family/social roles, personality, mood and energy, to generate a mean total score and physical and psychosocial sub-scores (Post et al., 2011; Vincent-Onabajo et al., 2016). The measure has good internal consistency (α = 0.77 - 0.89) (Post et al., 2011) and is validated in a bi-ethnic stroke population (α = 0.88) (Kerber et al., 2013). Higher mean scores indicate better QoL (Vincent-Onabajo et al., 2016).

Short Warwick Edinburgh Mental Wellbeing Scale (SWEMWBS). SWEMWBS has seven positively phrased items of wellbeing (Stewart-Brown et al., 2009). In clinical samples with mental health disorders, the SWEMWBS is considered sensitive (Shah et al., 2021) and "responsive to change", at a group and individual level (Shah et al., 2018, p. 6). Items are rated on a five-point Likert scale from 'none of the time' to 'all of the time', and totalled to give an overall score, where higher scores suggest higher levels of wellbeing (Stewart-Brown et al., 2009). License for use provided in Appendix J.

Feasibility and Acceptability

Feasibility criteria (Table 3) were based on a previous related study (Sathananthan et al., 2022).

Table 3

Feasibility Criteria

Criterion	Description
1	At least two participants recruited per month at the single intervention site.
2	Participant drop-out rates of less than 20%.
3	At least 80% participant attendance overall to the 40 sessions (five participants x eight sessions).
4	More than 50% homework completion rate per session for participants in attendance.
5	More than 80% outcome measure completion.
6	Clinicians adhere to more than 80% of session content listed in the manual to assess treatment fidelity. Co-facilitator monitored adherence for all sessions, and a third investigator not involved in intervention delivery assessed adherence in 25% of sessions by using a session checklist. The checklist was created from the protocol and listed each component of the session (including education, exercise, metaphors, discussion and breaks). The third investigator ticked each item if it occurred. Sessions one and four were randomly selected using a random number generator (Urbaniak & Plous, 2013).

For exploration of acceptability, feedback on the group format and therapy was obtained post-intervention via an online questionnaire. Acceptability is a multi-domain construct (Sekhon et al., 2017) though comprehensive assessment of acceptability was beyond the scope of this project. Feedback was used to appraise affective attitude and perceived effectiveness.

Procedure

Ethical approval [Reference: 25/SC/0156] was obtained by the NHS Health Research Authority and Health and Care Research Wales following a review by the Research Ethics Committee, on 23rd June 2025 (Appendix K). The trial is registered on ClinicalTrials.Gov (ID: NCT07512388).

Prior to study commencement, Patient and Public Involvement (PPI) was undertaken. This included discussions with two adult stroke survivors who assisted in improving the accessibility of supplementary materials (study poster, consent forms, information sheets, lay summary and questionnaires). Modifications made consisted of alterations to the language used, font size and layout for easy-read formatting. Considerations for methods of questionnaire completion and reminders were explored, with online, text and email reminders being regarded the least burdensome and most accessible in the context of the study design. Length of questionnaires were discussed, supporting decision-making around measures used for weekly and pre/post-intervention data collection.

Participants were recruited by their clinician in stroke services who gave them the study poster (Appendix L) and consent-to-contact form (Appendix M); via social media advertisements in Facebook groups for stroke survivors; and via the UKISPN mail list. Those interested received the participant information sheet (Appendix N), consent form (Appendix O) and sign-up form (Appendix P) to assess eligibility.

Participants were randomly allocated to five-, six-, or seven-week baselines, using a random number generator (Urbaniak & Plous, 2013). One participant was allocated to five weeks, and two participants to six and seven weeks respectively. Once per week, participants were sent a link to complete the CompACT-10 via JISC Online Surveys (JISC, 2021). Email and text reminders were sent (Appendix Q).

The ACT group was eight weeks, starting three days after the final baseline data collection. The group was held via Microsoft Teams for 90 minutes and delivered by the principal investigator (Trainee Clinical Psychologist) and another member of the research team (Clinical Psychologist). Principal Investigator undertook a 6-week ACT training course prior to study commencement. In session one and four, a third member of the research team (Clinical Psychologist) observed the group to assess protocol adherence.

On the morning of the group, participants continued receiving the link to the online questionnaire. Before the first session, a longer questionnaire of all outcome measures was completed. This was repeated at the end of the last session for pre-post comparison. Throughout the intervention, participants completed the CompACT-10 once per week, prior

to the session taking place. When completing questionnaires, participants were also informed they could pause/save their responses and return later if required.

Group intervention manual and materials were developed by Large et al. (2021). Permission to use materials and protocol provided in Appendix R. Sessions covered post-stroke challenges and key ACT processes to promote PF, including exploration of thoughts and feelings, patterns of getting caught up in these, and coping strategies; identifying personal values to focus on doing what matters; developing awareness of the present; learning how to make space for emotions; and fostering self-compassion. Breaks were provided to mitigate risk of fatigue. Table 4 provides an overview of session content. Mindfulness, experiential exercises, group discussions and activities were incorporated throughout.

Table 4

Session Overview

Week	Session Overview
1	Introduction to the ACT model and goal setting.
2	Identifying thoughts, feelings and current coping strategies.
3	Understanding distress and introducing values-based action.
4	Values versus goals and committed action.
5	The present moment awareness and mindfulness practice.
6	Cognitive defusion processes.
7	Acceptance and willingness to experience, including values-based action.
8	Self-Compassion, consolidating ACT skills and planning for the future.

Note: Session overview based on unpublished protocol developed by Large et al. (2021). Permissions to use protocol in Appendix R.

Analysis

Missing data were handled using an available data method, whereby missing data points are ignored and not estimated, as recommended by Peng and Chen (2021). 'Pre-intervention scores' refer to the first data collection point of the intervention phase (session 1) which was collected immediately before the intervention started and 'post-intervention

scores' refer to the final data collection point (session 8) which was collected after the session ended.

For the purpose of this SCED, efficacy of the intervention is defined by evidence of improvement across outcomes, with consideration for the magnitude of change where this can be calculated.

To summarise and interpret each participant's response to the intervention, participants are classified as responders or non-responders based on the overall pattern of results. Classification is based on guidance by Wise (2004) who suggests reliable and clinically significant change support assessment of meaningful individual-level change. For the purpose of this SCED and the primary aims to assess PF and underlying ACT theory, participants are classified as responders if there is a reliable and clinically significant improvement on the CompACT-10 and CORE-10.

Visual Analysis (VA)

According to Kennedy (2005), VA is key for a SCED to demonstrate and interpret the effect of an intervention. It enables evaluation of the trend, level and stability of data (Lane & Gast, 2014).

VA followed a protocol by Wolfe et al. (2019) for multiple baseline design. Baseline trend was determined using split-middle methods (White & Haring, 1980) because of its robustness against outliers (Manolov et al., 2024). Where baseline data were odd, the central data point was excluded so the number of datapoints are equal in each half, and a median is then calculated (SCED for Clinicians, n.d.). As per Wolfe et al. (2019)'s protocol, phase contrast, immediacy, overlap and intervention stability was only undertaken when the participant's baseline trend was stable, and treatment staggered between participants.

Reliable Change (RC) and Clinically Significant Change (CSC)

Reliable change index (RCI) and reliable change score (RCS) were calculated using test-retest reliability (ICC), mean and standard deviation where available, as per the guidance by Jacobson and Truax (1991). Where test-retest reliability was not available, Lambert and Bailey (2012) recommend using internal consistency (Cronbach's alpha).

RC was determined from a UK representative sample (CompACT-10) (Golijani-Moghaddam et al., 2023); stroke sample (CORE-10) (Steverson et al., 2024); stroke sample with mild aphasia (CIQ-15) (Dalemans et al., 2010); bi-ethnic stroke sample (SSQoL-12); and sex-specific norms from a nationally representative sample in England (SWEMWBS) (Ng Fat et al., 2017).

CSC followed guidance by Jacobson and Truax (1991). For the CORE-10, CSC followed criterion C where scores move from a clinical to non-clinical threshold (cut-off < 12 (Steverson et al., 2024)) and for the CompACT-10 and SWEMWBS, CSC followed Criterion B due to availability of data from a non-clinical sample. CSC was not determined for the CIQ-15 or SSQoL-12 as (to our knowledge) clinical cut-scores and data for non-clinical samples are not available.

Effect Size

TAU-U has good statistical power in single-case research (Tarlow, 2017). It assesses the between-phase effects and can control for baseline trend (Parker et al., 2011). Baseline trend is calculated using Kendall's Rank Correlation (Kendall's Tau) which is consistent with non-parametric methods of TAU-U (Parker et al., 2011). TAU-U was calculated using R Studio (Posit Team, 2025). Where there were tied ranks, p-values were based on normal approximation (R Core Team, n.d.). Code used is provided in Appendix S. Due to the nature of learning and practicing skills in psychological therapies (Mausbach et al., 2010; Yalom & Leszcz, 2020), significant intervention trends were accounted for when assessing intervention effects. Where baseline or intervention trends were not significant, only basic phase shift effects were interpreted (Tau A vs B).

Feasibility and Acceptability

Feasibility was assessed following criteria set out in Table 3 under 'Methods'. Recruitment rate, participant attendance, outcome measure and homework completion, and clinician adherence to intervention protocol was recorded.

Feedback supporting assessment of acceptability was reviewed and summarised descriptively, including (anonymised) participant quotes where applicable.

Results

Overall, Participant 1 demonstrated the strongest response to the intervention, indicated by reliable and clinically significant improvements across all outcomes where this could be assessed. Participant 4 also demonstrated clear response to the intervention, with reliable and clinically significant improvements observed for PF and clinically significant improvements in distress. Participants 2, 3 and 5 are considered non-responders, with no reliable and clinically significant improvements observed across measures. This is explained further in the remainder of this report.

Pre and Post Analysis – RCI and CSC

Table 5 outlines the pre- and post-intervention descriptives, and outcomes of RC and CSC for each participant on the CompACT-10, CORE-10, CIQ-15, SSQoL-12, and SWEMWBS.

Participant 1's scores improved for all measures, while other participant's changes in scores were mixed as illustrated by percentage changes in Table 5. Deterioration was most observed across measures for Participant 2. Largest changes were observed for two participants on the CompACT-10, CORE-10 and SSQoL-12.

Participants 1-4 showed a RC in score for at least one outcome measure, while none of Participant 5's scores changed reliably. No RC in independence was observed on the CIQ-15. Where reliable improvements were observed, CSC was also observed, except for Participant 4's wellbeing (SWEMWBS) score. CSC indicated that participants scores moved towards a non-clinical distribution. In line with where the largest percentage improvements are observed, the two participants whose CompACT-10 scores indicated a CSC in PF, also had a CSC in distress (CORE-10), indicating change in some domains underlying psychological adjustment.

Conversely, where deteriorations are observed, a RC was only observed for Participant 2's quality of life (SSQoL-12) score. CSC could not be ascertained for SSQoL-12 or CIQ-15 due to availability of data. All other deteriorations did not change reliably, nor was a CSC observed.

Table 5

Pre- and Post-Intervention Scores, Reliable Change and Clinically Significant Change

Participant	Pre-Score	Post-Score	Pre-Post Change (%)	Reliability	*M*	SD	RCS	RCI (95%)	RCI Outcome	CSC	Direction of Change
CompACT-10				0.83[a]	36.97	8.97					
1	13*	38	+192.31				4.78	10.25	Reliable change	Yes[e]	Improved
2	26	29	+11.54				0.57	10.25	No reliable change	No[e]	Improved
3	20	21	+5				0.19	10.25	No reliable change	No[e]	Improved
4	16	32	+100				3.06	10.25	Reliable change	Yes[e]	Improved
5	25	24	-4				-0.19	10.25	No reliable change	No[e]	Deteriorated
CORE-10				0.81[a]	15.86	8.15					
1	32*	9	-71.88				-4.58	9.85	Reliable change	Yes[fg]	Improved
2	14	13	-7.14				-0.20		No reliable change	No[g]	Improved
3	16	20	+25				0.80		No reliable change	No[g]	Deteriorated
4	16	10	-37.50				-1.19		No reliable change	Yes[fg]	Improved

5	20	18	-10				-0.40		No reliable change	No[g]	Improved
CIQ-15				0.96[a]	14.20	4.90					
1	10*	12.50	+25				1.80		No reliable change	-	Improved
2	8	7	-12.5				-0.72		No reliable change	-	Deteriorated
3	8.25	8.50	+3.03				0.18	2.72	No reliable change	-	Improved
4	21	19	-9.52				-1.44		No reliable change	-	Deteriorated
5	7.50	8.50	+13.33				0.72		No reliable change	-	Improved
SSQoL-12				0.88[b]	3.31	0.95					
1	1.17*	2.08	+77.78				1.96		Reliable change	-	Improved
2	2.67	1.92	-28.09				-1.61		Reliable change	-	Deteriorated
3	1.08	2.08	+92.60				2.15	0.91	Reliable change	-	Improved
4	2.50	2.42	-3.20				-0.17		No reliable change	-	Deteriorated
5	1.50	1.58	+5.33				0.17		No reliable change	-	Improved
SWEWMBS				0.84[b]							
1	13*	30	+130.77		23.59[c]	3.99[c]	7.53	4.42	Reliable change	Yes[e]	Improved
2	26	23	-11.54		23.67[d]	3.92[d]	-1.35	4.35	No reliable change	No[e]	Deteriorated
3	16	18	+12.5		23.67[d]	3.92[d]	0.9	4.35	No reliable change	No[e]	Improved
4	16	22	+37.5		23.59[c]	3.99[c]	2.66	4.42	Reliable change	No[e]	Improved
5	17	17*	0		23.59[c]	3.99[c]	0	4.42	No reliable change	No[e]	No change

Note: Mean (*M);* Standard Deviation (SD); Reliable Change Score (RCS); Reliable Change Index (RCI); Clinically Significant Change (CSC); - indicates data not available to be able to assess clinically significant change; Outcome Measures: Comprehensive assessment of Acceptance and Commitment Therapy processes short-form (CompACT-10); Clinical Outcomes in Routine Evaluation 10 (CORE-10); Community Integrated Questionnaire 15 (CIQ-15); Stroke Specific Quality of Life (SSQOL-12); Short Warwick Mental Wellbeing Scale (SWEMWBS); Pre-score refers to session 1 data; Post-score refers to session 8 data; Percentage Change '+' indicates improvement and '-' indicates deterioration for all measures, except CORE-10 where Percentage Change '+' indicates deterioration and '-' indicates improvement.

* Due to hospitalisation, participant 1's pre-scores were obtained halfway through the ACT intervention (session 4 of 8).

** one item of SWEMWBS not answered by participant.

[a] test-retest reliability (ICC).

[b] internal consistency (Cronbach's alpha).

[c] female-specific norms.

[d] male-specific norms.

[e] criterion B for clinically significant change.

[f] clinically significant change cut-off < 12.

[g] criterion C for clinically significant change.

Evaluation of Changes in Psychological Flexibility

Appendix T provides a summary of the descriptive statistics for the CompACT-10 at each data collection point during baseline and intervention stages for each participant.

Visual Analysis

Figures 1A-E show the weekly collected data at baseline and during the intervention phase (AB design) for the CompACT-10 for each participant. Trend lines are drawn to aid judgement of trend and stability. Table 6 summarises visual analysis assessments across participants.

All baseline phases had at least three data points. Four of five baseline trends demonstrated predictability of future behaviour. Participants 1, 2 and 4 showed a gradual incline in trend, and participant 5 showed a gradually declining trend. Participant 3's baseline data was not stable.

Phase contrast, immediacy, overlap and intervention stability were only assessed for one participant as per the protocol (Wolfe et al., 2019). Level, trend and variability change were identified across phases. Immediate changes in level and variability were identified, and trend change was observed after the intervention starting (phase contrast). 85.71% of treatment data overlapped with baseline data for the one participant assessed, indicating limited evidence of change in CompACT-10 scores during the intervention. However, intervention data was considered stable with a gradual increasing trend noted, indicating a possible delayed treatment effect of PF, underlying psychological adjustment.

Two participants had staggered treatment when comparing to the previous participant. Vertical analyses of participants across varying baseline lengths appeared to show no significant changes in outcome when the intervention began for any participant, indicating that visually there was no change in level of data when the intervention was introduced.

Visual analyses yielded a final rating of 0.97, indicating no basic effect and no functional relation. In other words, an effect of the intervention was not found across participants at staggered intervals, suggesting a potential role of other factors in outcome.

Table 6

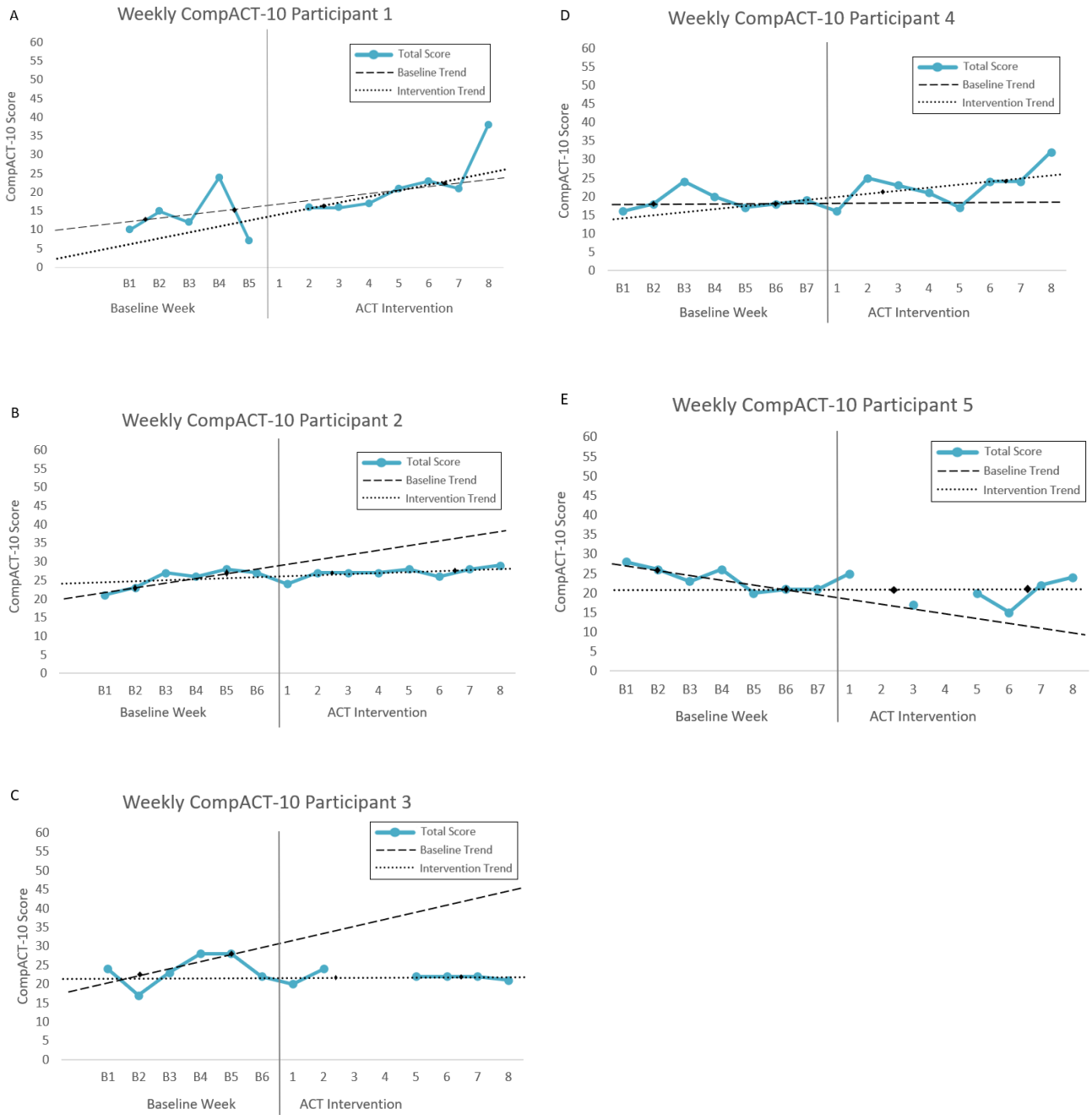
Within Participant Visual Analysis

Participant	Baseline Stability	Phase Contrast	Immediacy	Overlap	Intervention Stability
1	Gradual incline	Level change	Level and variability change	85.71%	Incline
2	Flat	-	-	-	-
3	Unstable	-	-	-	-
4	Gradual incline	-	-	-	-
5	Gradual decline	-	-	-	-

Note: Not assessed as per protocol is marked as '-'.

Figure 1A-E

Weekly CompACT-10 Data



Note: Baseline and intervention trend lines for illustrative purposes using split-middle methods (White & Haring, 1980).

Effect Size (TAU-U)

Table 7 summarises CompACT-10 phase trends, TAU-U scores and their significance per participant. Highlighted lines indicate the focus of analysis after adjusting for baseline trend significance and/or intervention trend significance.

A significant negative baseline trend was observed only for participant 5 (τ = -0.65, p = .046), indicating decreasing PF prior to the intervention commencing, so baseline trend was controlled for when assessing TAU-U.

During the intervention, a significant positive trend was observed for participant 1 (τ = 0.85, p = .009) and 2 (τ = 0.62, p = .040), indicating a significant increase in PF throughout the intervention. Intervention trends were non-significant for the remaining participants.

For participants 1, 2, 3 and 4, baseline and intervention phase comparisons (A vs. B) were non-significant, indicating that there was no significant difference in PF between the two phases.

However, when considering the significantly increasing trend during the intervention phase (A vs. B + trend B), a significant moderate-large effect was observed for Participants 1 and 2 (Participant 1: τ-U = 0.71, 95% CI [0.24, 0.91], p <0.001; Participant 2: τ-U = 0.46, 95% CI [-0.09, 0.8], p = <0.050)). This indicated a gradual improvement in PF, underpinning psychological adjustment.

For participant 5, when controlling for significant baseline trend (A vs. B – Trend A), a small, negative, non-significant effect was observed, indicating no phase difference in PF. Intervention trend was non-significant, so further analysis of phase difference was not undertaken.

Table 7

Phase Trend and TAU-U for CompACT-10

Participant	Phase Trend			Phase Comparison	τ-*U*	95% Confidence Interval		p
	Phase	*τ*	p			Lower	Upper	
1	Baseline	0	1.000	**A vs B**	0.66	0.13	0.89	0.060
				A vs B - Trend A	0.66	0.13	0.89	0.080
	Intervention	0.85	0.009**	**A vs. B + Trend B**	0.71	0.24	0.91	<0.001**
				A vs. B + Trend B - Trend A	0.61	0.05	0.88	<0.050
2	Baseline	0.69	0.056	**A vs B**	0.4	-0.17	0.77	0.210
				A vs B - Trend A	0.19	-0.38	0.65	0.560
	Intervention	0.62	0.040*	**A vs. B + Trend B**	0.46	-0.09	0.8	<0.050*
				A vs. B + Trend B - Trend A	0.27	-0.3	0.7	0.160
3	Baseline	0.14	0.702	**A vs B**	-0.44	-0.81	0.17	0.190
				A vs B - Trend A	-0.5	-0.83	0.1	0.170
	Intervention	-0.15	0.687	**A vs. B + Trend B**	-0.35	-0.77	0.28	0.170
				A vs. B + Trend B - Trend A	-0.3	-0.75	0.33	0.160

4	Baseline	0.20	0.543	**A vs B**	0.46	-0.06	0.79	0.130
				A vs B - Trend A	0.39	-0.15	0.75	0.230
	Intervention	0.40	0.170	**A vs. B + Trend B**	0.44	-0.09	0.78	0.050*
				A vs. B + Trend B - Trend A	0.31	-0.24	0.71	0.100
5	Baseline	-0.65	0.046*	**A vs B**	-0.45	-0.8	0.13	0.170
				A vs B - Trend A	-0.14	-0.64	0.44	0.700
	Intervention	0.07	1.000	**A vs. B + Trend B**	-0.32	-0.74	0.28	0.230
				A vs. B + Trend B - Trend A	-0.06	-0.59	0.5	0.760

Note: τ = Kendall's rank correlation coefficient; A = phase A (baseline phase); B = phase B (intervention phase); τ-*U* = TAU-U; * indicates significant finding at $p < 0.05$ level; ** indicates significant finding at $p < 0.010$ level; shaded rows refer to the data interpreted for analysis.

Feasibility, Group feedback and Acceptability

Five participants were recruited within two months, meeting the first feasibility criteria (two participants month one, three participants month two). All baseline measures were completed by participants, though Participant 3 completed week five's baseline questionnaire three days after receiving the reminder. 87.50% of measures during the intervention phase were completed, meaning 93.75% of measures were completed overall.

Of the eight intervention sessions, the median number of sessions attended was six (range = 5-8), with 82.50% attendance recorded overall. No participants dropped out. The average homework completion rate was 76.04% overall. Protocol was followed in full. 100% adherence was noted by a third researcher not involved in delivering the intervention in session one and four. All feasibility criteria were therefore met, providing preliminary evidence that group-based ACT for stroke survivors delivered via telerehabilitation is feasible for pilot clinical trials.

Questionnaire completion, session attendance, missing data per participant and individualistic factors including participant reported adverse events are summarised in Table 8.

Table 8

Questionnaire Completion, Session Attendance, Missing Data and Individualistic Factors

Participant	Baseline Length	Baseline, n (%)	Intervention, n (%)		Missing Data			Individualistic Factors
		Questionnaire	Session Attendance	Questionnaire	Overall	Baseline	Intervention	
1	5	5/5 (100)	6/8 (75)	7/8 (87.5)	7.69	0	12.50	**Session 1:** Missed session. Hospital attendance for seizure. **Session 4:** Fleeting thoughts of suicide (no intent)*, linked to seizure-related medication changes. **Session 6:** Missed session for health appointment.
2	6	6/6 (100)	8/8 (100)	8/8 (100)	0	0	0	**Sessions 5 and 6:** Hospital appointments impacting homework completion.
3	6	6/6 (100)	6/8 (75)	6/8 (75)	14.29	0	25	**Sessions 3 and 4:** Missed sessions for pre-planned holiday.

4	7	7/7 (100)	8/8 (100)	8/8 (100)	0	0	0	Participant 4 reported some visual impairments following their stroke, so the intervention materials and emails were adapted with larger, spaced font, in bold format prior to the intervention commencing. **Session 1:** Therapy goal identified to be more accepting of help from others.
5	7	7/7 (100)	5/8 (62.50)	6/8 (75)	13.33	0	25	**Session 2:** Missed session. Relative on end-of-life care. **Session 4:** Missed session (family bereavement). **Session 5:** New diagnosis of cancer and septal defect. **Session 8:** Missed session (cancer treatment side effects).

Note: * Risk assessment undertaken as per study protocol.

Four of five participants completed the feedback questionnaire, and all five participants fed back in sessions.

Regarding the online format, three participants reported it was “very easy” to join the video call, one rated it as “neither easy or difficult”, and three were supported by the research team or family to set up and join the video call.

Regarding the therapy itself, all four participants said it was easy to understand the content (three rated “very easy” and one rated “quite easy”). Participants valued the mindfulness practice, and “learning new techniques”, finding that the therapy “covered all bases”.

Participants most valued the opportunity of “talking to others in the same situation”, “hearing it’s not just me” and “knowing I wasn’t alone”, highlighting a sense of inclusion and belonging from being part of the group. One participant said they didn’t dislike anything about the therapy (“nothing”), while three said the “group was too small”, they would have liked “more engagement from other participants” and “that it was not tailored to the individual”.

To improve the therapy, one participant said they would prefer a “more personalised, bigger group”. One participant said they would prefer “face to face group sessions”, while another said, “it was better that the therapy was online as it allowed me to access it”

Three participants said they were “very likely” to recommend the therapy to others who have had a stroke and one said they were “neither likely nor unlikely”.

While broader aspects of acceptability were not assessed (such as opportunity cost and self-efficacy) the feedback indicates positive affective attitudes and the accessibility of the online format together with ease of joining indicated low burden of the telerehabilitation format.

Discussion

This study used a multiple baseline SCED to assess the preliminary efficacy of an eight-week online ACT group (protocol from Large et al. (2021)) in supporting adjustment post-stroke. Due to the preliminary nature of ACT research, this study also aimed to assess the feasibility and acceptability of the intervention to inform future pilot clinical trials.

Overall, preliminary findings for the treatment effects of an online ACT group for post-stroke adjustment across outcomes of PF and psychosocial wellbeing were mixed. Regarding PF, four of five participants' CompACT-10 scores improved (mean percentage improvement 77.21%). A reliable and CSC was observed in only Participants 1 and 4 whose scores improved by 192.31% and 100%. When comparing CompACT-10 scores between baseline and intervention phases, intervention effects were mixed and non-significant. However, when considering significant trends during the intervention phase, Participants 1 and 2 showed significant improvements in PF. Effects were moderate to large, indicating a potential intervention effect in these participants immediately post-intervention. Significant intervention trends indicate a potential cumulative effect of group-ACT on PF and therefore psychological adjustment. This may be explained by the need to learn, practice and apply skills outside of therapy (Mausbach et al., 2010; Yalom & Leszcz, 2020).

Regarding other aspects of psychosocial wellbeing as indicators of adjustment, findings were also mixed when comparing pre- and post-intervention scores. This may align with underlying theories that suggest psychological adjustment is a complex, non-linear and dynamic process, influenced by multiple domains and their interactions (Ellis-Hill et al., 2008; Gracey et al., 2009; Taylor, 1983). Participant 1 showed reliable and CSC across all measures except independence (CIQ-15) where this could be assessed, while other participants had a mixed profile of psychological adjustment. Where RC is observed in PF, distress and wellbeing, some CSC was found.

Where clinically significant improvements in PF were observed, a CSC in distress was also found. This is consistent with the ACT model that suggests PF is a process underpinning reductions in distress (Hayes et al., 2006). RC in QoL (SSQoL-12) was observed for three participants (1, 3 and 5), whose percentage change ranged from -28.09 to +92.60% (CSC could not be assessed). Wellbeing (SWEMWBS) improved reliably for two participants, though only Participant 1 experienced a CSC. No RC in independence was observed, and percentage changes were small in comparison to other indicators of psychological adjustment.

The variability in outcomes to assess post-stroke adjustment are in line with findings from Rauwenhoff et al. (2023) BrainACT study. This may be explained by several contextual factors. Firstly, research identified improvements in community integration can take longer

(six to 18 months post neurological rehabilitation) than other aspects of psychosocial wellbeing (Fortune et al., 2015). For the current study, no CSC in independence may therefore reflect the additional efforts/time required to implement broader lifestyle changes. Equally, PF is underpinned by processes of committed action for value-driven behaviour change which develops over time (Zhang et al., 2017), further explaining the variation and gradual, but cumulatively increasing trends in PF observed in this study. Due to the interconnectedness of factors underlying adjustment (Dawson & Golijani-Moghaddam, 2020; Ong et al., 2024; Rutschmann et al., 2024; Wersebe et al., 2018) improvements in wellbeing and quality of life may also continue beyond the intervention.

Secondly, differences in participant's personal circumstances may explain the mixed findings. Participant 4's therapy goal to be more accepting of support may partially explain the reduction in CIQ-15 score and instead indicate a growing acceptance of and adjustment to post-stroke challenges. Equally, Participants 1, 2 and 5, faced significant health challenges during the intervention. Participant 5 also reported other significant stressors including bereavement. Time required to attend appointments and other personal matters, as well as treatment side effects, potentially pose an additional barrier for frequent skill practice and application of therapy to daily life, further explaining the mixed findings of psychological adjustment.

Thirdly, not all sessions were attended. This is a common challenge faced across healthcare settings (Mitchell & Selmes, 2007), with non-attendance significantly impacting the rate and amount of symptom change (Xiao et al., 2017). Equally, while not researched in the context of therapy non-attendance, it is reported that session frequency (Reardon et al., 2002), engagement with taught content/skills (Kazantzis et al., 2010) and attendance consistency (Zimmerman, 2019) are associated with better outcomes. Therefore, the timing and frequency of missed sessions, content/skills missed, and whether workbooks were used to 'catchup' with missed content to improve continuity between sessions (something not monitored in this study) may contribute to the mixed findings.

Regarding the final aim of this study, preliminary assessments suggest the online ACT group for adults post-stroke may be acceptable and feasible for pilot clinical trials based on our assessment criteria of recruitment, retention, attendance, engagement and clinician adherence. This supports and extends the findings of Large et al. (2019); Patchwood et al.

(2024); Sathananthan et al. (2022). Participants feedback of the intervention was positive overall, referring to connecting with others in similar situations and learning new skills. Most participants valued the online format as it allowed them to access psychological support, they would not have otherwise had access to, though individual preferences were noted. Suggestions for improvements were offered, including increasing personalisation and larger therapy groups. Telerehabilitation is not intended to replace face-to-face methods and rather offers an alternative approach for greater individualisation (Chandler et al., 2026). Further qualitative research is required to explore stroke survivor's perspectives and preferences relating to telerehabilitation and group-based therapies to support the development of research in this specialist area.

Strengths and Limitations

Many strengths of this study have been described throughout. Firstly, assessment of group-based ACT that is delivered using online telerehabilitation methods may help research and healthcare services increase access to psychological therapy post-stroke. Secondly, the study measures underlying processes and indicators of psychological adjustment as opposed to anxiety or depression alone, to empirically assess whether ACT achieves its primary aim. Thirdly, a multiple baseline SCED with randomised participant allocation is used providing high internal validity of findings (Bouwmeester & Jongerling, 2020; Tate et al., 2013).

There are, however, some limitations to consider. Firstly, the small number of participants required for SCED hinders the generalisability of findings to the broader population or healthcare contexts (Jamshidi et al., 2018). Particularly as the mean age of the sample (53.4 years) may not reflect the ageing stroke population (Truelsen et al., 2006) and older adults may have different experiences or barriers to accessing psychological therapies delivered via telerehabilitation. Additionally, the nature of SCEDs requiring frequent measure completion means participant response fatigue is possible, reducing the accuracy of symptom/behaviour reporting over time (Ghafourifard, 2024). Collectively, this emphasises a further need for study replication with a more representative post-stroke sample to increase confidence and reliability of findings.

Secondly, reliance on self-report measures means demand characteristics and response bias may be high (Paulhus, 2020) and while outcomes for assessing psychological

adjustment were justified, existing research for ACT post-stroke has predominantly used separate measures of anxiety and depression (Liu et al., 2023; Majumdar & Morris, 2019; Niu et al., 2022; Sathananthan et al., 2022). Direct between study comparisons are therefore limited. This is important due to the overlap of adjustment and mood in physical health conditions (Kocaman et al., 2007), potentially having implications on routine screening within clinical practice. Moreover, while distress overlaps with mood, these are distinguishable (Clark & Watson, 1991; Horwitz, 2007), suggesting they may capture different aspects of psychological adjustment. This is something future researchers should consider for a more detailed understanding of group-based ACT via telerehabilitation for post-stroke adjustment.

Lastly, the intervention was delivered by two members of the research team. While intervention protocol was followed, psychotherapy research has illustrated that researcher allegiance (a belief/preference in intervention benefits) can result in inflated effect sizes compared to when an independent member facilitates intervention delivery (Dragioti et al., 2015). It is possible that researcher presence during the intervention further contributed to demand characteristics and response bias.

Future Research and Implications

To increase reliability, validity and generalisability of findings, larger scale replication of this study is required, particularly with a more representative post-stroke sample (for example older adults living in rural/coastal communities (Office for National Statistics, 2022; Truelsen et al., 2006)). In doing so, factors that may impact access to psychological therapies delivered via telerehabilitation should be identified and explored to support assessment of reasons for non-engagement, intervention feasibility, acceptability and accessibility. Researchers may wish to consider independent therapists to deliver the intervention to reduce the impact of researcher influence on outcomes. In doing so, researchers can more accurately assess the true efficacy of the online ACT group on post-stroke adjustment.

Secondly, given the time required to action and implement consistent behavioural changes (Mausbach et al., 2010; Yalom & Leszcz, 2020; Zhang et al., 2017), future research should ensure longitudinal assessment of outcomes. This has broader implications for healthcare services, supporting clinical decision-making around client benefit (clinically

meaningful change) and set-up practicalities (the need for follow-up reviews or booster sessions).

Moreover, due to the challenge of consistent therapy attendance in healthcare (Mitchell & Selmes, 2007), further understanding of the impact of missed therapy sessions on psychological adjustment and wellbeing is required. Researchers should report percentage attendance and specific sessions/homework missed with reasons where possible. It may be beneficial to group participants based on low, moderate or high attendance so comparisons can be made to understand the impact of missed sessions. Consideration to the timing, content and consecutive nature of missed sessions is vital to provide further context to understanding outcomes, having broader clinical implications on how services should support those who missed therapy sessions.

Finally, in line with participant feedback, study replication with larger group sizes will support understanding of optimal therapy conditions for promoting post-stroke adjustment. However, larger groups may increase the challenge of improving personalisation of therapy to individuals as also suggested in participant feedback. Future researchers should therefore consider a mid-therapy 1:1 review session to support monitoring of progress towards individual therapy goals, particularly if increasing therapy group sizes as individuals may be less open to sharing personal challenges. This may strengthen the immediate benefits of the intervention, potentially providing a stronger foundation for long-term application of therapy skills into everyday life. Such modifications to the intervention have implications for clinical practice in terms of resources required (equipment and staffing), cost (staff and training), and service management (waiting lists). Acceptability and feasibility should continue to be assessed when modifying interventions to support services to undertake cost-benefit analyses when making decisions surrounding post-stroke care. The Medical Research Council Complex Intervention Framework (MRC CIF) can be used to inform future intervention feasibility and acceptability by using an iterative approach of reviewing study findings and modifying intervention content/procedures and study design, accordingly, including the suggestions made within this discussion (Skivington et al., 2021). It is recommended that future research is guided by the principles of MRC CIF and draws upon the existing body of research, including this work, to develop interventions that are feasible,

acceptable, and cost-effective. SCEDs, such as the current paper, can provide important insights for those planning full-scale RCTs.

Conclusion

Overall, preliminary findings of an ACT group delivered via telerehabilitation for post-stroke adjustment were mixed, consistent with existing research (Rauwenhoff et al., 2023; Sathananthan et al., 2025). Some significantly moderate-to-large effects on PF found, with increasing intervention trends indicating a cumulative effect of ACT, though visual analyses did not illustrate a basic effect of the intervention, indicating a potential role of other factors in outcome. Where RC is observed, some CSC was found for PF, distress and wellbeing, which is consistent with ACT theory, though pre- and post-intervention changes were mixed across participants. Limited sample, mixed attendance, and significant life events during the intervention may explain the findings. Study limitations and directions for future research are identified, with reference to implications for post-stroke research and clinical practice.

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Chapter 5: Discussion and Critical Evaluation

The overall aim of this thesis portfolio was to explore whether group-based psychological interventions are effective for post-stroke mood and adjustment.

The systematic review aimed to assess whether group-based psychological interventions are efficacious in improving mood (anxiety and depression) post-stroke, to support the progression of post-stroke psychological services for more optimised rehabilitation. Meanwhile, the empirical paper had two aims. Primarily, this paper aimed to assess the preliminary efficacy of an eight-week Acceptance and Commitment Therapy (ACT) group delivered via telerehabilitation on post-stroke adjustment, indicated by changes in psychological flexibility (PF), and pre-post indicators of psychological adjustment (distress, quality of life (QoL), participation, and wellbeing). The intervention was developed by Large et al. (2021) following a randomised control trial of a four-week ACT group. The second aim of the empirical study was to explore the preliminary feasibility and acceptability of the online ACT group for adult stroke survivors to inform future pilot clinical trials.

This chapter summarises these findings with reference to underlying theory of ACT and adjustment in chronic health, exploring the strengths and limitations of the portfolio, before discussing the implications and future directions for research and clinical practice.

Summary of Findings

The systematic review identified eight studies assessing the efficacy of group-based psychological interventions on post-stroke mood (anxiety and depression). Meta-analyses revealed a significant moderately positive effect on depression, when excluding studies that did not primarily target mood or had high risk of bias. Such sensitivity analyses also revealed a smaller positive, though non-significant, effect on anxiety. A further sub-group analysis of ACT group interventions post-stroke had a moderate, though non-significant, effect on depression. The effect on anxiety could not be assessed due to limited data.

There was, however, a small number of studies included in this review, and substantial heterogeneity was identified across analyses due to variation in participant characteristics, outcome measures, intervention content (including education and skills), session duration and frequency, group sizes, presence of clinical professionals and location of delivery. Risk of bias assessments raised some concern and assessments of imprecision,

indirectness and inconsistency using the GRADE (Grading of Recommendations Assessment, Development and Evaluation) approach (Prasad, 2024; Schünemann et al., 2023), indicated very low certainty of evidence exists, reducing confidence in the results. This emphasised a need for further research into the efficacy of group-based psychological therapies for post-stroke mood.

The empirical project identified mixed findings for the preliminary efficacy of an ACT group delivered via telerehabilitation for post-stroke adjustment. Firstly, some effect of the intervention on PF was found, though this was not consistent across participants. A cumulative effect, whereby PF increased gradually throughout the eight-week intervention was observed, with a significantly moderate-to-large effect found for two of five participants. This delayed effect may reflect the time it takes to learn, practice and implement skills outside of therapy (Mausbach et al., 2010; Yalom & Leszcz, 2020; Zhang et al., 2017). Other psychosocial outcomes were also mixed across participants. Where reliable change was observed, some clinically significant changes were also found on outcomes of PF, distress and wellbeing which is consistent with the ACT model that suggests PF is a process underlying distress (Hayes et al., 2006). No reliable change was observed for independence and clinical significance could not be ascertained for independence or QoL. Mixed findings for psychological adjustment could be explained by the number, timing and frequency of sessions missed, homework adherence, and significant life challenges (external to the study) that arose for participants during the intervention as well as differences in time/efforts required to implement some lifestyle changes over others (Fortune et al., 2015).

Preliminary feasibility and acceptability of the ACT group delivered via telerehabilitation was considered, based on criteria frequently used in stroke research, to inform future pilot clinical trials. Participant feedback further informed this. They reported valuing the sense of shared experience and learning new skills. Many reported that the remote delivery of the group meant they could access psychological support they would not have otherwise had access to, though individual preferences in the format of delivery were noted. Suggestions for larger groups and increased personalisation were made by participants, and three of four participants said they were ‘very likely’ to recommend the therapy to other stroke survivors.

Collectively, the systematic review and empirical project increase our understanding of the preliminary efficacy of group-based psychological interventions, particularly ACT, on post-stroke adjustment through assessment of some of its underlying processes and psychosocial indicators. Preliminary findings suggest further research into group-based psychological therapies is warranted, with focus on improving methodological quality. This may help to reduce the extent to which findings are mixed, increasing certainty in intervention efficacy and providing clearer directions for future research.

Tentatively, while certainty of evidence of existing research is very low, there are some key factors of stroke and group-based psychological therapies to consider that could support future research in this area. Firstly, social connection is considered important for reducing isolation and improving symptoms of depression (Alvarez et al., 2025; Nagy & Moore, 2017). Group-based interventions allow for this connection with others through shared experience and peer support (Yalom & Leszcz, 2005), reducing the psychosocial burden experienced both in depression (Pfeiffer et al., 2011) and post-stroke (Hollands et al., 2024; May et al., 2023). Cruwys et al. (2014, p. 144) found that social identification, the sense of belonging from connecting with others in similar situations, had a larger positive impact on symptoms of depression than anxiety because the key features of depression ("withdrawal, purposelessness and loneliness") are closely linked to the sense of belonging that is embodied in social identification. It may therefore be important for group-based psychological interventions for post-stroke depression to ensure sufficient opportunities for social connection. Social connection could be measured in research with the Social Connectedness Scale (Lee & Robbins, 1995) or through qualitative interviewing techniques exploring themes such as meaningful relationships, belonging, social participation and loneliness/isolation (Wilkinson et al., 2019).

Moreover, the treatment of anxiety in group settings may be more challenging due to the role of uncertainty and unfamiliarity of situations, settings and people in anxiety, particularly when an individual's intolerance to uncertainty is high (Gu et al., 2020). This may contribute to differences in findings for depression and anxiety following group-based psychological interventions, particularly where sessions limited in length and frequency are offered, as they potentially reduce opportunity for increased certainty and familiarity with the therapy process itself, group members and staff/clinicians/researchers. This may

therefore be a particularly important factor to consider implementing into psychoeducational components of group therapies for post-stroke anxiety, given uncertainty for health and future already being particularly high post-stroke (White et al., 2014).

However, mixed findings across psychosocial outcomes more broadly may also reflect the more complex, non-linear, interplay of identity (current versus ideal self) and coping as proposed in models of adjustment in acquired brain injuries (Ellis-Hill et al., 2008; Gracey et al., 2009; Taylor et al., 2011). ACT considers such processes through supporting individuals to explore the self-as-context, acceptance, values-based action and cognitive defusion (Hayes et al., 2006), for the development of a more flexible sense of self (Zhang et al., 2017). Assessment of underlying constructs of PF was not within the scope of this project, so further research is required to better understand adjustment after stroke and development of intervention targets.

Strengths and Limitations

There are many strengths of this thesis portfolio to consider. This thesis contributes to our understanding of group-based psychological interventions post-stroke. The systematic review provides preliminary insight into the efficacy of group therapies on post-stroke mood and identifies how to improve the quality of research in this area. The empirical project extended these findings with a single-case experimental design on the efficacy of an online ACT group post-stroke, by monitoring the core component of ACT alongside psychosocial factors that are frequently used as indicators of psychological adjustment in chronic health conditions (Dekker & de Groot, 2018). These studies make a crucial contribution to the currently limited evidence base and clinical practice given the shift to online/remote methods of delivery following Covid-19 (Weinberg, 2021) and the prevalence of psychopathology post-stroke (Knapp et al., 2020; Mitchell et al., 2017).

However, there are some limitations to consider. Firstly, this thesis prioritises research into stroke survivors, independent of their carers/primary support systems. A large component of adjusting post-stroke concerns interpersonal relationships, including changes in roles and identity within carer-stroke survivor dyads (Greenwood et al., 2009; McCarthy et al., 2020), the need and request of support from others (Evans & Northwood, 1983) and the nature of caregiver involvement (Thompson et al., 1989). Therefore, psychological group

therapies incorporating carers or immediate support systems may result in different outcomes of psychological adjustment. This may be particularly relevant for ACT-based interventions, given the need for committed action to value-based goals (Hayes et al., 2011) and the role of support systems in rehabilitation motivation and QoL (Lee & Won, 2022); but also for NHS stroke services, given NICE guidelines recommend carer involvement in post-stroke rehabilitation (NICE, 2023b). Therefore, the findings from this portfolio may have not sufficiently captured psychological adjustment or the setup of NHS services post-stroke, warranting further research to improve clinical utility.

A stringent focus on stroke survivors independent of their support systems possibly contributed to the limited number of high-quality studies identified in the systematic review. However, regardless, a limited evidence base consisting of substantial heterogeneity indicates challenges beyond the constraints of the review. Variability in outcome measures, intervention structure and content may suggest a lack of consensus on the definition of and constructs underlying post-stroke wellbeing and adjustment. Consequently, conclusions drawn from the systematic review were limited and resulted in further preliminary assessment of intervention efficacy within the empirical project. Further research with greater methodological quality is required to understand the efficacy of group-based psychological therapies for post-stroke mood before establishing consensus for intervention targets, improving clinical application of findings.

Additionally, while findings of the empirical study met the proposed feasibility criteria, there were some recruitment challenges faced within NHS stroke services which must be addressed. Due to time and resource constraints of this study, a one size fits all approach was used across all recruitment avenues. However, not all NHS stroke services align with this process, with differences noted in routine distress screening of patients and staff capacity to assess their caseload against eligibility criteria. This singular recruitment screening process may have therefore limited participant reach within NHS services due to potential burden placed on clinicians. In future, researchers should consider adapting recruitment processes to better align with NHS services.

Finally, for the empirical study, participants diagnosed with other major health conditions in the last 12 months and/or other neurological conditions were not eligible. This was to increase the likelihood that post-stroke adjustment was assessed, as opposed to

adjustment to other chronic health conditions. However, the sample may subsequently not reflect broader stroke populations given the prevalence of comorbidities post-stroke (Appelros et al., 2021). This has implications on the application of the intervention and findings in clinical services, warranting further research.

Implications for Theory and Future Research

Given the limited number of high-quality studies included in the systematic review and the substantial heterogeneity found between studies, future research should prioritise replicating and improving methodological quality of existing research on group-based therapies for post-stroke mood. As discussed in Chapter 2 ('Systematic Review and Meta-Analysis'), this may include designing studies with larger sample sizes; clearer reporting of participant characteristics, attrition rates and dropout reasons, how missing data was handled, and intervention features; ensuring study protocols with pre-specified analysis plans are available and cited within trial publications, blinding of outcome assessors where possible; using active control groups rather than waitlist comparisons; and consistent follow-up periods for longitudinal assessments.

Once methodological quality is improved, findings of the systematic review and meta-analysis can be extended, to establish more accurate pooled effect sizes of group therapies for anxiety and depression post-stroke. However, given limitations of the thesis portfolio, researchers may also wish to consider broader adaptations of interventions, including the role of carers and support systems to incorporate interpersonal components of adjustment. This will support understanding of factors underlying psychological adjustment post-stroke but may also enable assessment of whether support systems can improve therapy engagement/attendance post-stroke which is a pertinent challenge within healthcare (Mitchell & Selmes, 2007). Interventions will subsequently have greater clinical utility, better reflecting NICE (2023) guidelines for stroke rehabilitation and therefore post-stroke services. In the longer term, this may inform service planning, resource allocation and clinical decision making within post-stroke healthcare services.

Given the recruitment challenges faced within the empirical study, researchers should engage with clinicians and NHS services during designing of the study to support more tailored recruitment strategies that align with routine clinical practice. In turn, a

service-led approach may improve recruitment, and enhance feasibility assessments of the intervention. Where resources allow, multi-site designs may further enhance recruitment and improve generalisability of findings (Das, 2022), improving clinical utility of interventions.

Implications for Clinical Practice and Service Development

While the systematic review found low certainty of evidence in the efficacy of group-based psychological therapies for post-stroke mood, and preliminary findings of the empirical project on an ACT group via telerehabilitation post-stroke were mixed across processes and components underlying adjustment, there are many clinical implications of the portfolio.

Firstly, group-based therapies may help alleviate service pressures faced within the NHS, by increasing access to the same treatment resource and reducing service costs (Whittingham et al., 2023). However, with the risk of disability and comorbidities post-stroke (Appelros et al., 2021; Chen et al., 2025), and need for frequent attendance to psychological therapies (Tiemens et al., 2019), mental health support is not easily accessible (Mitchell & Selmes, 2007). Consequently, with the shift in providing more remotely delivered healthcare post-Covid-19 (Weinberg, 2021), the empirical study provides initial insights into an online delivered ACT group, with feedback suggesting the format meant participants could receive support they otherwise would not have had access to. With clear benefits for stroke survivors, telerehabilitation may also benefit services, with improved access reducing the number of missed appointments (Greenup & Best, 2025) (and therefore resource inefficiencies) and improving health outcomes, reducing readmissions (Shambushankar et al., 2025).

It must be recognised that inequalities in access to digital devices/services exist (Lythreatis et al., 2022; Ofcom, 2025), however, and post-stroke difficulties can further pose a barrier to technology use (Lemke et al., 2020). The empirical study excluded those with severe cognitive and language difficulties, so future research must consider how stroke survivors with such disabilities can be practically supported to attend remotely delivered therapies, as well as how remotely delivered therapies could be adapted to promote equal access.

Finally, regarding exclusions, as discussed throughout this portfolio, the data within the systematic review and empirical study sample may not truly reflect post-stroke populations due to the stringent criteria in place. This limits the applicability of findings to clinical populations and post-stroke services. Further research is therefore required with better represented samples, including older adults, adults residing in rural/coastal communities and minorities who face additional barriers to accessing healthcare (All-Party Parliamentary Group, 2022; Bamrah et al., 2025). This will improve generalisability of findings to post-stroke populations, having implications on clinical practice and service development.

Conclusion

Overall, this thesis portfolio explores preliminary insights into the efficacy of group-based psychological therapies post-stroke on mood (anxiety and depression) and common indicators of psychological adjustment. The systematic review found very low certainty of evidence that group-based psychological interventions improve mood post-stroke due to substantial heterogeneity and concern for risk of bias. Future research should prioritise improving methodological quality of research and replicating existing studies for more accurate pooled effect size estimates to be established. The empirical study found some, cumulative effect, of an ACT group delivered via telerehabilitation on psychological flexibility, with a moderate-to-large effect for two participants compared to baseline. Where improvements in psychological flexibility were noted, reductions in distress were also observed, which aligns with underlying ACT theory. Other psychosocial factors assessed showed mixed findings across participants, potentially explained by individualistic factors and the time it takes to practice skills and implement lifestyle changes beyond the therapy context. Elements of feasibility and acceptability for future pilot clinical trials is considered, supported by participant feedback. Collectively, the findings of the empirical study provide preliminary insight into the efficacy of an ACT group delivered via telerehabilitation on post-stroke adjustment. Further research is warranted to improve understanding of how a remotely delivered ACT group may influence underlying processes of adjustment with implications for clinical practice, including access to psychological therapy post-stroke and alleviation of NHS pressures.

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Appendices

Appendix A

Requirements for Submission to the Neuropsychological Rehabilitation Journal

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Updated 08-07-2025

Appendix B

PRISMA Abstract and Report Checklist

Table B1

PRISMA Abstract Checklist

YesSection and Topic	Item #	Checklist item	Reported (Yes/No)
TITLE			
Title	1	Identify the report as a systematic review.	Yes
BACKGROUND			
Objectives	2	Provide an explicit statement of the main objective(s) or question(s) the review addresses.	Yes
METHODS			
Eligibility criteria	3	Specify the inclusion and exclusion criteria for the review.	Yes
Information sources	4	Specify the information sources (e.g. databases, registers) used to identify studies and the date when each was last searched.	Yes
Risk of bias	5	Specify the methods used to assess risk of bias in the included studies.	Yes
Synthesis of results	6	Specify the methods used to present and synthesise results.	Yes
RESULTS			
Included studies	7	Give the total number of included studies and participants and summarise relevant characteristics of studies.	Yes
Synthesis of results	8	Present results for main outcomes, preferably indicating the number of included studies and participants for each. If meta-analysis was done, report the summary estimate and confidence/credible interval. If comparing groups, indicate the direction of the effect (i.e. which group is favoured).	Yes
DISCUSSION			
Limitations of evidence	9	Provide a brief summary of the limitations of the evidence included in the review (e.g. study risk of bias, inconsistency and imprecision).	No
Interpretation	10	Provide a general interpretation of the results and important implications.	Yes

YesSection and Topic	Item #	Checklist item	Reported (Yes/No)
OTHER			
Funding	11	Specify the primary source of funding for the review.	No
Registration	12	Provide the register name and registration number.	No

Note: Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., & Brennan, S. E. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *bmj*, *372*. https://doi.org/10.1136/bmj.n71

Table B2

PRISMA Report Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	11
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	12
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	13
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	15
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	15-16
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	15
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	15
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	16-17
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	17

Section and Topic	Item #	Checklist item	Location where item is reported
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	17
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	17
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	17
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	17-18
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	17
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	18
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	18
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	18
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	18
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	18
Reporting bias	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from	18

Section and Topic	Item #	Checklist item	Location where item is reported
assessment		reporting biases).	
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	18
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	19-20
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	19
Study characteristics	17	Cite each included study and present its characteristics.	21-33
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	34-36
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	31-33 and 37-41
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	37-41
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	37-41
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	37-41
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	37-41
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	N/A

Section and Topic	Item #	Checklist item	Location where item is reported
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	41-43
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	44-45
	23b	Discuss any limitations of the evidence included in the review.	45-46
	23c	Discuss any limitations of the review processes used.	45-46
	23d	Discuss implications of the results for practice, policy, and future research.	46-47
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	15
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	15
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	N/A
Competing interests	26	Declare any competing interests of review authors.	48
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	48 and 164 (Appendix D)

Note: Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., & Brennan, S. E. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *bmj*, *372*. https://doi.org/10.1136/bmj.n71

Appendix C

Search String

(stroke OR "stroke survivor" OR "stroke survivors" OR "stroke patient" OR "post-stroke" OR "post stroke" OR poststroke) AND ("randomi?ed contro* trial*" OR RCT OR "clinical trial" OR intervention) AND (anxiety OR depression OR wellbeing OR "well-being" OR mood)

Appendix D

Cochrane RoB-2 Signalling Questions Summary

Table D1

Cochrane RoB-2 Signalling Questions Summary

Study	Outcome	Domain 1: Randomisation				Domain 2: Deviations								Domain 3: Missing Outcome Data					Domain 4: Measurement of the Outcome						Domain 5: Selection of Reported Result				Overall RoB
		1	2	3	Overall	1	2	3	4	5	6	7	Overall	1	2	3	4	Overall	1	2	3	4	5	Overall	1	2	3	Overall	
Jones et al. (2022)	A, D	Y	Y	PN		Y	PY	PN	NA	NA	PY	NA		PN	PY	NA	NA		N	PN	N	NA	NA		Y	N	N		
Liu et al. (2023)	D	Y	Y	N		PY	Y	NI	NA	NA	PY	NA		Y	NA	NA	NA		N	N	N	NA	NA		NI	NI	NI		
Majumdar et al. (2019)	A, D	Y	Y	N		Y	PY	NI	NA	NA	Y	NA		N	N	PY	PN		N	PN	Y	PY	PN		NI	NI	NI		
Niu et al. (2022)	D	Y	Y	N		PY	PY	NI	NA	NA	PY	NA		N	PN	PY	PN		N	N	PY	PY	PN		NI	NI	NI		
Udvardi et al. 2024)	A, D	Y	NI	N		PY	PY	NI	NA	NA	PY	NA		PN	PN	PY	PN		N	N	PY	PY	PN		NI	NI	NI		
Xiong et al. (2025)	A, D	Y	NI	N		Y	PY	NI	NA	NA	PY	NA		N	Y	NA	NA		PN	N	N	NA	NA		NI	NI	NI		
Yu et al. (2023)	A, D	Y	Y	N		PY	PY	NI	NA	NA	Y	NA		N	N	PY	PY		N	N	PY	PY	PN		NI	NI	NI		

Yue et al. (2024)	A, D	Y	Y	N		PY	PY	NI	NA	NA	PY	NA		N	N	PY	PY		N	PN	PY	PY	PN		NI	NI	NI		

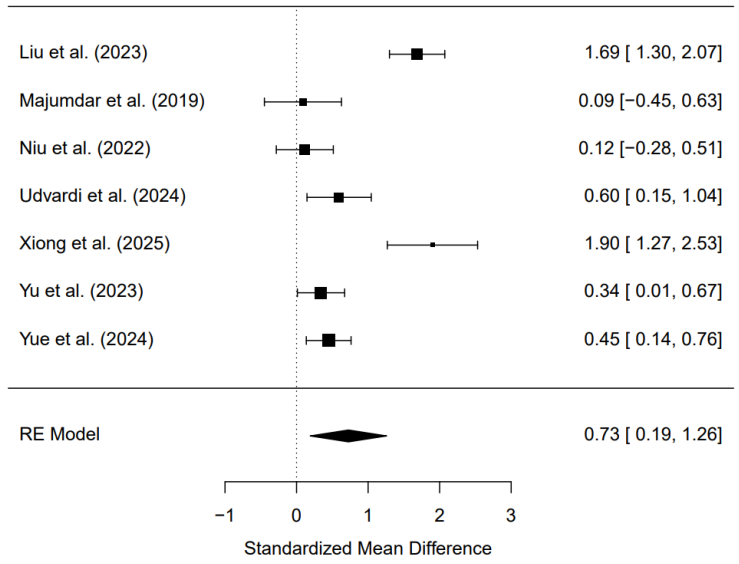
Note: Outcomes: Anxiety (A), Depression (D); Ratings: Yes (Y), Probably Yes (PY), No (N), Probably No (PN), Not Applicable (NA), No Information (NI); Overall Risk of Bias Ratings: Low risk (green), some concern (yellow), high risk (red).

Appendix E

Random Effects Forest Plots for Depression

Figure E1

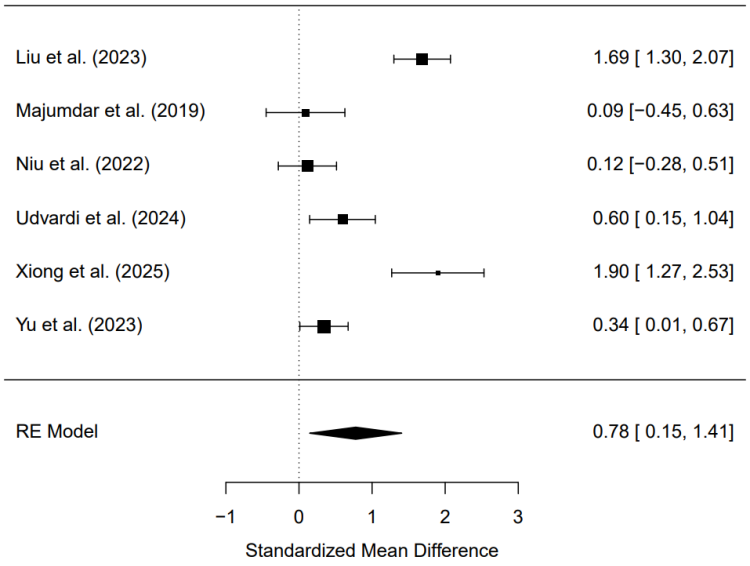
Random Effects Forest Plot for Sensitivity Analysis of Depression, Excluding Jones et al. (2025)



Note: n = 7, Jones et al. (2025) excluded for sensitivity analysis.

Figure E2

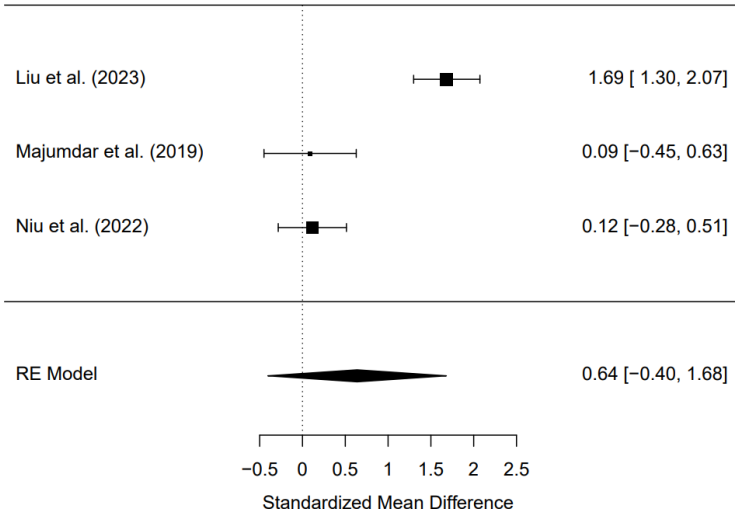
Random Effects Forest Plot for Sensitivity Analysis of Depression, Excluding Jones et al. (2025) and Yue et al. (2024)



Note: n = 6, Jones et al. (2025) and Yue et al. (2024) excluded for sensitivity analysis.

Figure E3

Random Effects Forest Plot for Sub-Group Analysis of ACT Interventions for Depression



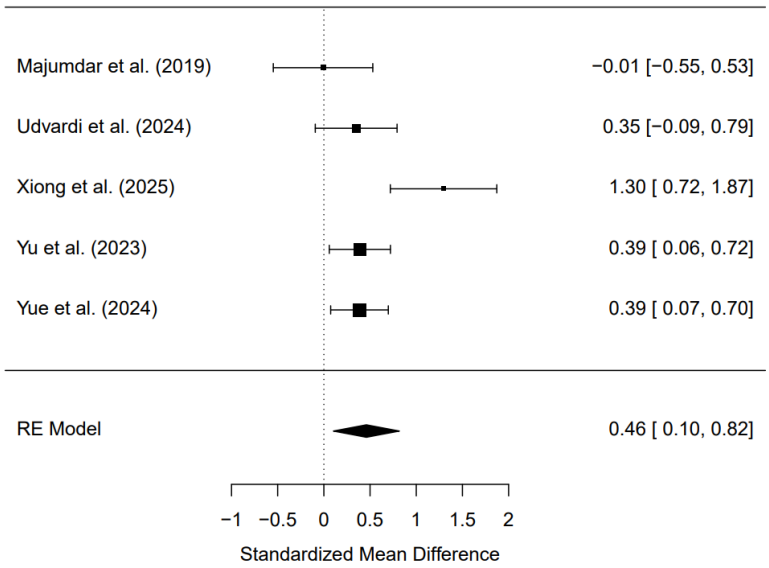
Note: n = 3

Appendix F

Random Effects Forest Plots for Anxiety

Figure F1

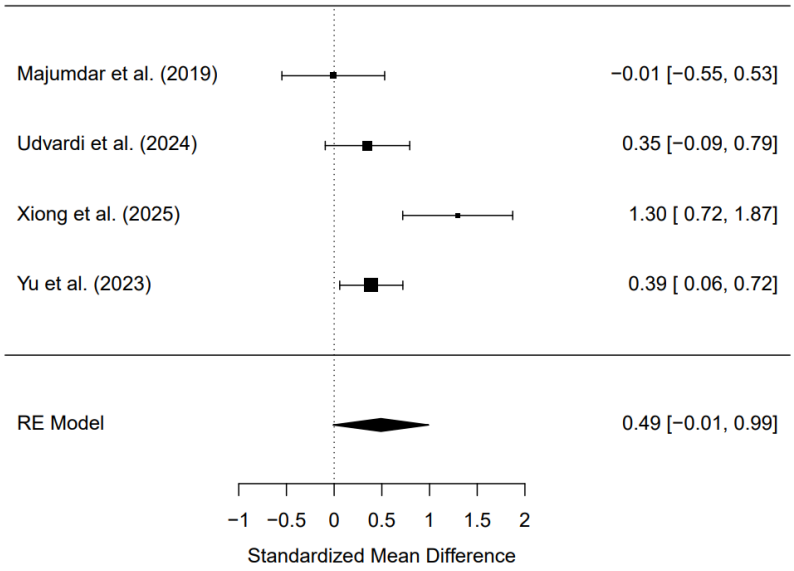
Random Effects Forest Plot for Sensitivity Analysis of Anxiety, Excluding Jones et al. (2025)



Note: n = 5, Jones et al. (2025) excluded for sensitivity analysis.

Figure F2

Random Effects Forest Plot for Sensitivity Analysis of Anxiety, Excluding Jones et al. (2025) and Yue et al. (2024)



Note: n = 4, Jones et al. (2025) and Yue et al. (2024) are excluded.

Appendix G

Systematic Review: List of Recommendations for Future Research

- Replicating and improving methodological quality of existing studies can be achieved by:
    - Ensuring adequately powered studies with large sample sizes.
    - Clear reporting of participant characteristics (stroke type, severity or number, impairments, time since stroke and comorbidities).
    - Ensuring study protocols are registered and available, with clear descriptions of plans for analysis. Referencing protocols in RCT methodology can improve ease of assessment of risk of bias.
    - Clear reports of attrition rates and dropout reasons. Summarised in tables or figures may help.
    - Clearly outlining intention-to-treat methods and reporting how missing data was handled and analysed.
    - Where possible, blinding outcome assessors and using active control groups rather than waitlist comparisons.
    - Ensuring clear descriptions of interventions components and features, beyond the broad therapy used (CBT, ACT). Features may include session length and frequency, therapy duration, and session content such as specific psychoeducation, skills and strategies and group discussions and how these are adapted to stroke survivors.
    - Consistent follow-up periods for both anxiety and depression assessing long-term effectiveness. Current follow-up periods appear to be two and three months.
- Ensure monitoring of both anxiety and depression due to their comorbid nature and current imbalance in number of studies available per disorder.
- Once sufficient evidence is available, future research should consider:
    - Comparing effectiveness of group therapy versus individual (1:1) therapy post-stroke with reference to cost-benefit analysis at a service and patient level and mechanisms underlying changes in mood.
    - Identifying sub-groups who are more likely to benefit from one intervention over another, with consideration for demographic factors that face greater health

inequalities. For example, older adults, rural/coastal communities and ethnic minorities.

Appendix H

Requirements for Submission to the Journal of NeuroRehabilitation

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When an article is accepted for publication, authors are required to pay a publication fee of $600/£500.

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Preparing your manuscript for submission

Your article must be within the scope of the journal and be of sufficient quality. If not, it will not be reviewed. Please read the journal's Aims and Scope to see if your article is appropriate.

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Article types

Research articles: Research articles should present novel work within the scope of the journal which represents an important advancement in knowledge or understanding. Research articles need to include an introduction, a well-reported methodology, results, and a discussion of the results in the context of the published literature. Submissions must not exceed 25 pages, excluding references, tables and figures.

Review articles: Review articles should be authoritative and topical and provide comprehensive and balanced coverage of a timely and/or controversial issue. For systematic reviews, authors should consult PRISMA and prepare their reviews as per the PRISMA Checklist. We recommend the EQUATOR Network and the NLM's Research Reporting Guidelines and Initiatives as good sources for reporting guidelines. Submissions must not exceed 7500 words and include no more than 80 references and a maximum of 10 tables and figures. The search should have been carried out within the past 6 months so that the manuscript is timely.

Brief reports: Brief reports are articles of original scholarship of unusual interest of less than 1500 words (excluding references). They should be structured as research articles (see above) and may have a structured abstract. A total of two tables and/or figures are allowed.

Letter to the editor: Authors can submit comments of 1000 words or less concerning prior articles published in *NeuroRehabilitation*. Letters should not exceed 500 words and five references; should have one table/figure maximum; should have no abstract or key points; and should include any conflicts of interest.

Reporting guidelines

Your manuscript **must** follow the relevant EQUATOR Network reporting guidelines, depending on the type of study. The EQUATOR wizard can help identify the appropriate guideline. You will need to upload the appropriate checklist with your submission.

Other resources can be found at NLM's Research Reporting Guidelines and Initiatives.

If your research involves animals, you will be asked to confirm that you have carefully read and adhered to the ARRIVE guidelines.

Formatting your manuscript

Accepted file types

The preferred format for your manuscript is Word. You do not need to follow a template, but please ensure your heading levels are clear, and the sections clearly defined.

Your article title, keywords, and abstract all contribute to its position in search engine results, directly affecting the number of people who see your work. For details of what you can do to influence this, visit How to help readers find your article online.

Title

Your manuscript's title should be concise, descriptive, unambiguous, accurate, and reflect the precise contents of the manuscript. A descriptive title that includes the topic of the manuscript makes an article more findable in the major indexing services.

Abstract

Please include a structured abstract of 250 words between the title and main body of your manuscript that concisely states the purpose of the research, major findings, and conclusions.

For clinical trials, the trial registry name and URL, and registration number must be included at the end of the abstract. Submissions that do not meet this requirement will not be considered.

Keywords

Please include a minimum of 6-8 terms from the MeSH database, listed after the abstract. Keywords should be as specific as possible to the research topic.

Artwork, figures, and other graphics

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    - **The listed affiliation should be the institution where the research was conducted**. If an author has moved to a new institution since completing the research, the new affiliation can be included in a note at the end of the manuscript – please indicate this on the title page.
    - **All persons eligible for authorship must be included at the time of submission (please see the authorship section for more information)**.
- Contact information for the corresponding author: name, institutional address, phone, email

- Acknowledgments section
- Declaration of conflicting interest
- Funding statement
- Ethical approval and informed consent statements
- Data availability statement
- Any other identifying information related to the authors and/or their institutions, funders, approval committees, etc, that might compromise anonymity.

Acknowledgments

If you are including an Acknowledgements section, this will be published at the end of your article. The Acknowledgments section should include all contributors who do not meet the criteria for authorship. Per ICMJE recommendations, it is best practice to obtain consent from non-author contributors who you are acknowledging in your manuscript.

Writing assistance and third party submissions: if you have received any writing or editing assistance from a third-party, for example a specialist communications company, this must be clearly stated in the Acknowledgements section and in the covering letter. Please see the Sage Author Gateway for what information to include in your Acknowledgements section. If your submission is being made on your behalf by someone who is not listed as an author, for example the third-party who provided writing/editing assistance, you must state this in the Acknowledgements and also in your covering letter. **Please note that the journal editor reserves the right to not consider submissions made by a third party rather than by the author/s themselves.**

Author contributions

You will be asked to list the contribution of each author as part of the submission process. Please include the Author Contributions heading within your submission after the Acknowledgements section. The information you give on submission will then show under the Author Contributions heading later at the proofing stage.

Statements and declarations

To ensure proper anonymization, please include a section with the heading 'Statements and Declarations' on your title page, after the Acknowledgements section [and Author Contributions section if applicable] including each of the sub-headings listed below. If a declaration is not applicable to your submission, you must still include the heading and state 'Not applicable' underneath. Please note that you may be asked to justify why a declaration was not applicable to your submission by the Editorial Office. This information will be added to the end of your published paper.

Ethical considerations

Please include your ethics approval statements under this heading, even if you have already included ethics approval information in your methods section. If ethical approval was not required, you need to explicitly state this. You can find information on what to say in your ethical statements as well as example statements on our Publication ethics and research integrity policies page.

All papers reporting studies involving human participants, human data or human tissue must state that the relevant Ethics Committee or Institutional Review Board approved the study, or waived the requirement for approval, providing the full name and institution of the review committee in addition to the approval number. If applicable, please also include this information in the Methods section of your manuscript.

Consent to participate

Please include any participant consent information under this heading and state whether informed consent to participate was written or verbal. If the requirement for informed consent to participate has been waived by the relevant Ethics Committee or Institutional Review Board (i.e. where it has been deemed that consent would be impossible or impracticable to obtain), please state this. If this is not applicable to your manuscript, please state 'Not applicable' in this section. More information and example statements can be found on our Publication ethics and research integrity policies page.

Consent for publication

Submissions containing any data from an individual person (including individual details, images or videos) must include a statement confirming that informed consent for

publication was provided by the participant(s) or a legally authorized representative. Non-essential identifying details should be omitted. Please do not submit the participant's actual written informed consent with your article, as this in itself breaches the patient's confidentiality. The Journal requests that you confirm to us, in writing, that you have obtained written informed consent to publish but the written consent itself should be held by the authors/investigators themselves, for example in a patient's hospital record. The confirmatory letter may be uploaded with your submission as a separate file in addition to the statement confirming that consent to publish was obtained within the manuscript text. If this is not applicable to your manuscript, please state 'Not applicable' in this section.

Declaration of conflicting interest

The journal requires a declaration of conflicting interests from all authors so that a statement can be included in your article. For guidance on conflict of interest statements, see our policy on conflicting interest declarations and the ICMJE recommendations.

If no conflict exists, your statement should read: 'The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article'.

Funding statement

All articles need to include a funding statement, under a separate heading, **even if you did not receive funding**. You'll find guidance and examples on our Funding page.

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- Include a data availability statement linking to your data. If it is not possible to share your data, use the statement to confirm why it cannot be shared.
- Cite this data in your research

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Every in-text citation must have a corresponding citation in the reference list and vice versa. Corresponding citations must have identical spelling and year.

Authors should update any references to preprints when a peer reviewed version is made available, to cite the published research. Citations to preprints are otherwise discouraged.

Supplemental material

This Journal can host additional materials online (e.g. datasets, podcasts, videos, images etc.) alongside the full text of the article. Your supplemental material must be one of our accepted file types. For that list and more information please refer to our guidelines on submitting supplemental files.

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Manuscripts should only be submitted with the consent of all contributing authors. The individual responsible for submitting the manuscript should carefully check that all those whose work contributed to the manuscript are listed as authors.

Ensure you upload all relevant manuscript files, including any additional supplemental files (including reporting guidelines where relevant).

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Please view our authorship policies, which includes information on criteria for authorship, who should be the corresponding author and more.

Please note that AI chatbots, for example ChatGPT, should not be listed as authors. For more information see the policy on Use of ChatGPT and generative AI tools.

Files

- **Cover letter.** To help the Editor in their preliminary evaluation, please indicate why you think the manuscript suitable for publication.

- **Title Page** with all required identifying information as laid out in Preparing your manuscript for submission (above). This **will not** be sent to the peer reviewers.
- Your **manuscript**, properly formatted and anonymized according to all stipulations above, and within the scope of the journal. Any information that compromises the anonymity of the author(s) should be removed or anonymized and included on the Title Page instead. See above for more information on anonymization. This version **will** be sent to the peer reviewers.
    - All figures must be numbered consecutively in the order in which they appear in the text – they will appear in the published article in the order they are numbered.
    - Figure resolution is 300dpi. More information on figure/image preparation can be found here.
- **Supplemental material.** This journal can host additional materials online (e.g. datasets, podcasts, videos, images, etc) alongside the full-text of the article. Your supplemental material must be one of our accepted file types. For that list and more information please refer to our guidelines on submitting supplemental files.

Other information required for submission

- We encourage all authors and co-authors ensure their ORCID IDs are linked to their accounts in the submission system prior to article acceptance, as this is the only way to have their ORCID ID present on the published article. **ORCID IDs cannot be added to manuscripts after acceptance/publication.**
    - Please note that each co-author must log in to the journal submission system to add their own ORCID ID to their account. To add an ORCID ID, edit your account, click the link when prompted, and sign into your ORCID account to validate your ID. You will then be redirected back to the submission system and your ORCID ID will become part of your accepted publication's metadata.
    - Please create an ORCID ID if you do not already have one or visit our ORCID homepage to learn more.

- Complete list of authors, with their institutional affiliations.
    - The author information you enter at submission must exactly match what is included on your manuscript and/or title page, including full names, academic affiliations, and corresponding author contact details.
    - **The listed affiliation should be the institution where the research was conducted.** If an author has moved to a new institution since completing the research, the new affiliation can be included in a note at the end of the manuscript.
    - **All listed authors must meet the criteria for authorship (above).**
    - **All persons eligible for authorship must be included at the time of submission.**
    - All authors must have given consent for the manuscript to be submitted in its current form.
- Keywords: During submission, you may be asked to select or enter keywords for your manuscript. These keywords are used to match appropriate reviewers to your manuscript.
- The number of figures, tables, and words in your manuscript.
- Funder information: Name, grant/award number.
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- If you have posted your manuscript to a preprint server, you will be asked to supply the DOI (this does not prohibit submission, but no changes should be made to the preprint version while your manuscript is under evaluation in this journal). Please see our guidelines on prior publication. If the article is accepted for publication, the author may re-use their work according to the journal's author archiving policy. If your manuscript is accepted, you must include a link in your preprint to the final version of your published article.

Peer review policy

The following summary describes the peer review process for this journal:
Identity transparency: Double-anonymized
Reviewer interacts with: Editor
Review information published: None

Your manuscript will undergo an initial evaluation. If it does not conform to the requirements laid out in these guidelines, it will be returned to you for amendments prior to peer review. Manuscripts may be desk rejected without peer review at this point if they are out of scope for the journal or otherwise unsuitable.

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To ensure the integrity of the peer review process we assign reviewers and cannot accept author recommendations.

All manuscripts are reviewed as rapidly as possible, while maintaining rigor. Reviewers make comments to the author and recommendations to the Editor who then makes the final decision on all manuscripts, including those appearing in a special issue or special collection. The Editor or members of the Editorial Board may occasionally submit their own manuscripts for possible publication in the Journal. In these cases, the peer review process will be managed by alternative members of the Board and the submitting Editor/Board member will have no involvement in the decision-making process.

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decision can be made. This ensures a comprehensive and robust peer review process, aligning with our commitment to publish the most credible and valid research. Care is taken not to invite any Editorial Review Board Member or Editorial Board Member that has any potential conflict of interest with any author of the paper.

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editing portal, Sage Edit, or by email, and should be returned promptly to avoid delaying publication. Authors are reminded to check their proofs carefully to confirm that all author information, including names, affiliations, sequence, and contact details are correct, and that Funding and Conflict of Interest statements, if any, are accurate. **This is the final opportunity to make changes to your manuscript. Further corrections will not be possible after publication. Changes to the author list are not permitted at this stage.**

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Publication is not the end of the process. Between us, we can ensure that your article is found, read, downloaded and cited as widely as possible. Many of the most effective tactics are those you can do quickly and easily to your network of contacts and peers. Visit the Promote Your Article page on the Sage Journal Author Gateway for numerous resources to help you promote your work.

Appendix I

The Single-Case Reporting guideline In Behavioural interventions (SCRIBE) 2016 Checklist

Item number	Topic	Item description	**Notes**
TITLE and ABSTRACT			
1	Title	Identify the research as a single-case experimental design in the title	Page 60
2	Abstract	Summarise the research question, population, design, methods including intervention/s (independent variable/s) and target behaviour/s and any other outcome/s (dependent variable/s), results, and conclusions	Page 62
INTRODUCTION			
3	Scientific background	Describe the scientific background to identify issue/s under analysis, current scientific knowledge, and gaps in that knowledge base	Page 63 to 67
4	Aims	State the purpose/aims of the study, research question/s, and, if applicable, hypotheses	Page 67
METHODS			
	DESIGN		
5	Design	Identify the design (e.g., withdrawal/reversal, multiple-baseline, alternating-treatments, changing-criterion, some combination thereof, or adaptive design) and describe the phases and phase sequence (whether determined a priori or data-driven) and, if applicable, criteria for phase change	Page 67
6	Procedural changes	Describe any procedural changes that occurred during the course of the investigation after the start of the study	N/A
7	Replication	Describe any planned replication	Page 67
8	Randomisation	State whether randomisation was used, and if so, describe the randomisation method and the elements of the study that were randomized	Page 67 and 73
9	Blinding	State whether blinding/masking was used, and if so, describe who was blinded/masked	Page 67
	PARTICIPANT/S or UNIT/S		
10	Selection criteria	State the inclusion and exclusion criteria, if applicable, and the method of recruitment	Page 68
11	Participant characteristics	For each participant, describe the demographic characteristics and clinical (or other) features relevant to the research question, such that anonymity is ensured	Page 69
	CONTEXT		
12	Setting	Describe characteristics of the setting and location where the study was conducted	Page 73
	APPROVALS		
13	Ethics	State whether ethics approval was obtained and indicate if and how informed consent and/or assent were obtained	Page 72 to 73
	MEASURES and MATERIALS		
14	Measures	Operationally define all target behaviours and outcome measures, describe reliability and validity, state how they were selected, and how and when they were measured	Page 70 to 72
15	Equipment	Clearly describe any equipment and/or materials (e.g., technological aids, biofeedback, computer programs, intervention manuals or other material resources) used to measure target behaviour/s and other outcome/s or deliver the interventions	Page 70 to 72
	INTERVENTIONS		
16	Intervention	Describe intervention and control condition in each phase, including how and when they were actually administered, with as much detail as possible to facilitate attempts at replication	Page 72 to 73
17	Procedural fidelity	Describe how procedural fidelity was evaluated in each phase	Page 72 to 73
	ANALYSIS		
18	Analyses	Describe and justify all methods used to analyse data	Page 73 to 75
RESULTS			
19	Sequence completed	For each participant, report the sequence actually completed, including the number of trials for each session for each case. For participant/s who did not complete, state when they stopped and the reasons	Page 87 to 88
20	Outcome and estimation	For each participant, report results, including raw data, for each target behaviour and other outcome/s	Page 75 to 89

21	Adverse events	State whether or not any adverse events occurred for any participant and the phase in which they occurred	Page 87 to 88
DISCUSSION			
22	Interpretation	Summarise findings and interpret the results in the context of current evidence	Page 89 to 92
23	Limitations	Discuss limitations, addressing sources of potential bias and imprecision	Page 92 to 93
24	Applicability	Discuss applicability and implications of the study findings	Page 93 to 94
DOCUMENTATION			
25	Protocol	If available, state where a study protocol can be accessed	Intervention protocol not publicly available. Permission to use in Appendix R, Page 212.
26	Funding	Identify source/s of funding and other support; describe the role of funders	N/A

Appendix J

SWEMWBS License for Use

Submission (ID: 613804753) receipt for the submission of /fac/sci/med/research/platform/wemwbs/using/non-commercial-licence-registration

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From no-reply@warwick.ac.uk <no-reply@warwick.ac.uk>
Date Tue 24/09/2024 09:08
To Holly Avery (MED - Postgraduate Researcher) <Holly.Avery@uea.ac.uk>

Warning: This email is from outside the UEA system. Do not click on links or attachments unless you expect them from the sender and know the content is safe.

Thank you for completing the registration for a Licence to use WEMWBS for non-commercial purposes.
You now have access to the scales and the associated resources here on our website: https://warwick.ac.uk/wemwbs/using/register/resources
We suggest you bookmark this page for future reference.
The information declared on your Registration Form is documented below. Please retain a copy of this email as a record of your Licence together with the Terms and Conditions you have accepted.
If you have any questions please contact us via email: wemwbslicence@warwick.ac.uk

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Question: Type of use
Answer:
Evaluation of service, intervention or approach

Question: If other, please specify
Answer:

Question: Type of intervention (if applicable) Tick all that apply
Answer:
Psychological therapy
Other (eg routine NHS provision; other service provision)

Question: If other, please specify
Answer:
Outcome monitoring following psychological therapy and in accordance with the WEMWBS cost saving report.

Question: Field of Use
 (Tick all that apply)
Answer:
University or college

Question: Preferred version of WEMWBS
 (Note – both versions of WEMWBS can be used under a single licence)
Answer:
SWEMWBS - Shortened 7 item scale

Question: Age of Participants (Tick all that apply)
Answer:
18-64
65+

Question: How many participants are you planning to use WEMWBS with? (Scale of use)
Answer:
0-50

Question: Start Date
Answer:
26/09/2024

Question: End Date
Answer:
01/10/2026

Question: Territories of Use: In which geographical areas will you be using WEMWBS? (tick all that apply)

Answer:
United Kingdom

Question: In which language(s) are you planning to use WEMWBS?
 Tick all that apply Please note that we may not be able to offer a translation into every language you require

Answer:
English

Question: If other, please specify
Answer:

Question: Organisation name
Answer:
University of East Anglia

Question: Type of organisation
Answer:
University

Question: If other, please specify
Answer:

Question: Size of Organisation (no. of employees)
Answer:
51-500

Question: Organisation Address
Answer:
UEA, Research Park, Norwich NR4 7TJ

Question: Country of Organisation
Answer:
UK

Question: Website
Answer:
https://www.uea.ac.uk/

Question: Contact Name
Answer:
Holly Avery

Question: Job Title
Answer:
Trainee Clinical Psychologist

Question: If other, please specify
Answer:

Question: Email
Answer:
holly.avery@uea.ac.uk

Question: I have read and agreed to the terms of the Non-Commercial Licence
 Please print and retain a copy for your reference
Answer:
Yes

Question: I agree to my contact details being shared with third parties for the purposes of product development of WEMWBS
Answer:
No

Question: Receiptwarning
Answer:

Appendix K

Ethical Approval

Ymchwil Iechyd a Gofal Cymru
Health and Care Research Wales

NHS
Health Research Authority

Miss Holly Avery
University of East Anglia
Research Park
Norwich
NR4 7TJ

Email: approvals@hra.nhs.uk

23 June 2025

Dear Miss Avery

HRA and Health and Care Research Wales (HCRW) Approval Letter

Study title:	**ACT for Post-Stroke Adjustment Via Telerehabilitation: A Case Series**
IRAS project ID:	**348067**
Protocol number:	**N/A**
REC reference:	**25/SC/0156**
Sponsor	**Organization not set**

I am pleased to confirm that **HRA and Health and Care Research Wales (HCRW) Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications received. You should not expect to receive anything further relating to this application.

Please now work with participating NHS organisations to confirm capacity and capability, in line with the instructions provided in the "Information to support study set up" section towards the end of this letter.

How should I work with participating NHS/HSC organisations in Northern Ireland and Scotland?
HRA and HCRW Approval does not apply to NHS/HSC organisations within Northern Ireland and Scotland.

If you indicated in your IRAS form that you do have participating organisations in either of these devolved administrations, the final document set and the study wide governance report (including this letter) have been sent to the coordinating centre of each participating nation. The relevant national coordinating function/s will contact you as appropriate.

Please see IRAS Help for information on working with NHS/HSC organisations in Northern Ireland and Scotland.

How should I work with participating non-NHS organisations?
HRA and HCRW Approval does not apply to non-NHS organisations. You should work with your non-NHS organisations to obtain local agreement in accordance with their procedures.

What are my notification responsibilities during the study?

The standard conditions document "*After Ethical Review – guidance for sponsors and investigators*", issued with your REC favourable opinion, gives detailed guidance on reporting expectations for studies, including:

- Registration of research
- Notifying amendments
- Notifying the end of the study

The HRA website also provides guidance on these topics, and is updated in the light of changes in reporting expectations or procedures.

Who should I contact for further information?
Please do not hesitate to contact me for assistance with this application. My contact details are below.

Your IRAS project ID is **348067**. Please quote this on all correspondence.

Yours sincerely,
Deanna Herron

Approvals Specialist

Email: approvals@hra.nhs.uk
Copy to: *Ms Katt Riley*

Appendix L

Study Recruitment Poster

IRAS ID: 348067
25.03.25
Version 1

Participants Required

University of East Anglia

Acceptance and Commitment Therapy (ACT) for Post-Stroke Adjustment

1. Why are we doing this research?

ACT is a psychological therapy that helps people adjust to living with long-term health conditions.

More research is needed to see if this helps people after a stroke.

Aim: We want to assess how effective and feasible an online group of ACT is for stroke survivors.

2. Who can take part?

- ⇒ 18 years +
- ⇒ Had a stroke 3+ months ago.
- ⇒ No ongoing therapy.
- ⇒ Access to a device with a camera.

3. What do I have to do?

Online weekly questionnaire	Online weekly group therapy & questionnaire	Online questionnaire	£10
Weeks 1-7	Weeks 8-15	After 3 and 6 months	Gift Card

4. Want to take part?

Find out more: https://app.onlinesurveys.jisc.ac.uk/s/uea/act-stroke-study

Or contact me: Holly Avery
(Trainee Clinical Psychologist)
holly.avery@uea.ac.uk



Appendix M

Consent to Contact Form

IRAS ID: 348067, 25.02.25, Version 1

Consent to Contact Form

Please provide your contact details below:

Name:_____

Email address:_____

Preferred Telephone Number:_____

Statement	**Initials**
I consent to the research team contacting me on the details above about the study on 'Acceptance and Commitment Therapy for Post-Stroke Adjustment' as I would like more information.	

Appendix N

Participant Information Sheet

Participant Information Sheet

IRAS ID: 34806,. 24.06.25, Version 3

ACT for Post-Stroke Adjustment via Telerehabilitation

Thank you for your interest in our study.

Before you decide to take part, the information below will help you to understand why this study is being done and what you will be asked to do. Taking part is optional.

Please take your time reading this information. Our contact details are at the end of this document, should you want further information or have any questions.

Why is this study being conducted?

Acceptance and Commitment Therapy (ACT) is a psychological therapy that aims to alter how we relate to our distress. It aims to help us distance ourselves from our difficult thoughts and feelings by improving our acceptance of things out of our control. As a result, we can focus on the present and do the things that are most important to us.

Research has shown that ACT can help people adjust to the challenges in many long-term health conditions, but the research is limited when helping people cope after a stroke. So far, research has found that ACT can improve mood post-stroke when the therapy is delivered face-to-face or 1:1.

The problem is that there can be long waiting lists in the NHS for psychological therapies and after a stroke, some people may find it difficult to attend appointments face-to-face.

Our aim:

- To see whether ACT is effective in helping adults adjust to living after a stroke.

- To see whether an online group intervention of ACT is feasible and acceptable for adults who have suffered a stroke.

Who can take part?

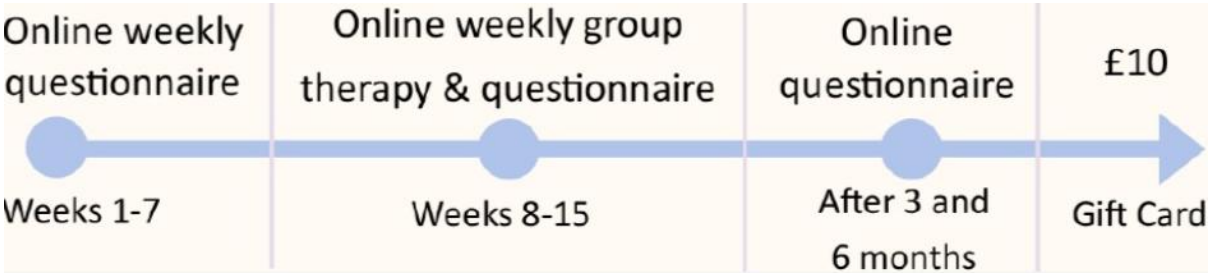
You must meet the following criteria to take part:

- Over 18 years of age.
- Suffered a stroke more than 3 months ago.
- Have no other neurological illness such as a traumatic brain injury.
- Not currently receiving any psychological intervention. No severe communication difficulties, such as aphasia.
- No severe cognitive difficulties.
- No severe psychological disorder.
- Have not been diagnosed with a major health condition (except for a stroke) in the last 12 months. This could include but is not limited to cardiac illness, diabetes, arthritis or liver disease.
- Have access to a device with a camera, a stable internet connection and private space for video calls.

What happens if I take part?

If you decide to take part, we will arrange a 30-minute video call to check your eligibility and explain the study in more detail. Here, you can ask any questions you may have.

Below is a timeline of what to expect after we check if you meet the criteria:



- **Weeks 1-7**: You will complete a questionnaire once per week for up to 7 weeks. The online questionnaire will take approximately 5 minutes. We will send you the link to do this each week by text/email.

- **Weeks 8-15:** You will attend eight weeks of acceptance and commitment therapy for post-stroke adjustment. This will be held online via Microsoft Teams in a group of 9 participants. There will be one 90-minute session per week (including breaks). You will repeat the 5 minute questionnaire. After the eight weeks of therapy, we will ask for feedback on how you found it. Feedback can be given via an online questionnaire which will take approximately 10 minutes to complete.

- **3- and 6-month follow-up:** After 3 and 6 months, we will ask you to complete the questionnaire one final time. You will receive a reminder of when to do this. This questionnaire will take approximately 10 minutes.

Please note we will provide written instructions on how to access the virtual call for the therapy sessions.

At the end of the study, you will be given a £10 gift card as a thank you for your time.

Do I have to participate?

No. **You do not have to participate if you do not want to**. If you decide to take part, you can change your mind at any time and do not have to give a reason.

What are the possible benefits of taking part?

Aside from helping us identify and improve psychological rehabilitation for other stroke survivors, you may:

- Notice an improvement in your mood.
- Experience less distress.

- Learn something new about yourself and improve your quality of life.
- Meet other people who have also suffered a stroke and find benefits in peer support.

You do not need to travel anywhere to take part. The study can be completed from your place of residence with a stable internet connection.

What are the possible risks of taking part?

While research has found that ACT can improve wellbeing, your mood may worsen due to the discussion of potentially sensitive topics. You may feel fatigued after each session due to prolonged concentration in front of a screen. Breaks will be provided.

While we will do everything we can to ensure confidentiality, we cannot control what information other participants share outside of the group. It is possible that personal details are shared by other participants to those not involved in the research. For this reason, all participants should only share what they feel comfortable sharing.

How will we use information about you?

We will need to use information from you for this research project. This information will include your:

- Name
- Date of birth
- Address
- Contact details
- GP
- Next of Kin

This information will help the research team check you meet the criteria to take part and ensure you have access to support during the study, should you need it.

The University of East Anglia is the sponsor of this research, and is responsible for looking after your information. We will keep all information about you safe and secure by saving it on the University of East Anglia's OneDrive in a password protected file.

OneDrive is a secure online storage space that can only be accessed by the researchers listed at the end of this document. This ensures that your information is kept safe and confidential.

Your data will **not** be shared outside the UK.

Please note that confidentiality will be breached if you express thoughts of suicide or there is a concern for your welfare. The researchers will share your contact details and any relevant information with the necessary people such as your next of kin, GP, or the emergency services. This will be discussed with you but is in place to ensure you get support.

Once we have finished the study, we will keep some of the data so we can check the results. We will write our reports in a way that no-one can work out that you took part in the study.

We will keep your study data for 10 years, in accordance with the University of East Anglia's Data Management Policy. The study data will then be **fully anonymised** and **securely archived** or **destroyed.**

What are your choices about how your information is used?

- You can stop being part of the study at any time, without giving a reason, but we will keep information about you that we already have.
- You have the right to ask us to remove, change or delete data we hold about you for the purposes of the study. We might not always be able to do this if it means we cannot use your data to do the research. If so, we will tell you why we cannot do this.

Where can you find out more about how your information is used?

You can find out more about how we use your information by:

- Asking one of the research team.
- Contacting dataprotection@uea.ac.uk

Thank you for taking the time to read this information sheet.

What Next?

- If you are **concerned about your mental health** and/or would like information and advice, please see a list of charities and helplines below.
- If you want **to discuss this research in more detail**, please contact one of the members of the research team below.
- If you are interested in taking part, **please click 'Next' to see the consent form and eligibility criteria**.

Research Team Contact Details:

Holly Avery (Trainee Clinical Psychologist): holly.avery@uea.ac.uk

Dr Joshua Blake (Clinical Psychologist)

Dr Tom Steverson (Clinical Psychologist)

If you have any concerns or wish to make a complaint about the study, please contact either:

- Dr Joshua Blake (Research Team): joshua.blake@uea.ac.uk
- Professor Sian Coker (Independent to the Research Team): s.coker@uea.ac.uk

If you are concerned about your mental health, please see where you can seek support below:

Mind

A UK mental health charity that provides information on various mental health difficulties. You can also find other ways to get support via their website.

You can access their website here: https://www.mind.org.uk/

Samaritans:

To talk about how you are feeling, you can contact Samaritans' free helpline 24 hours a day, 365 days a year.

Dial: 116 123

You can access their website here: https://www.samaritans.org/

Shout:

If you prefer to text someone for mental health support, text SHOUT to 85258. This is a 24/7 service for if you need immediate help.

You can access their website here: https://giveusashout.org/

National Suicide Prevention Helpline UK

If you are having thoughts of suicide and need someone to talk to, you can call the helpline on 0800 689 5652. Helpline is open 6pm-midnight every day.

NHS Services

You can call **NHS 111 and select option 2** to speak to someone for help and support around mental health.

In an emergency, please dial 999.

Appendix O

Participant Consent Form

ACT for Post-Stroke Adjustment via Telerehabilitation

We are aiming to recruit 9 stroke survivors for our study. If you would like to take part, please answer the questions below.

If you meet the criteria to take part, we will contact you soon.

IRAS ID: 348067, 25.03.25, Version 1.

1. Consent Form *

I have read and understand the information sheet which explains the purpose of the study and what is expected of me.

- ◯ I Agree
- ◯ I disagree

I understand that I can withdraw at any time without giving a reason.

- ◯ I Agree
- ◯ I disagree

I understand how my data will be stored and when it will be deleted.

- ◯ I Agree
- ◯ I disagree

I understand that any responses included in the published report will be fully anonymised with all identifiable information removed.

- ◯ I Agree
- ◯ I disagree

I understand the possible benefits and risks to taking part.

- ◯ I Agree
- ◯ I disagree

I agree to the researchers breaching confidentiality if there are concerns for my wellbeing. They can contact my

next of kin, GP, and emergency services as required.

- ◯ I Agree
- ◯ I disagree

I consent to my data being stored until the research is completed.

- ◯ I Agree
- ◯ I disagree

I consent to the research team contacting me via the details provided.

- ◯ I Agree
- ◯ I disagree

I consent to taking part in the study.

- ◯ I Agree
- ◯ I disagree

Appendix P

Sign-Up Form

ACT for Post-Stroke Adjustment via Telerehabilitation

We are aiming to recruit 9 stroke survivors for our study. If you would like to take part, please answer the questions below.

If you meet the criteria to take part, we will contact you soon.

IRAS ID: 348067, 25.03.25, Version 1.

About You:

2. Name: *

3. Date of Birth: *

4. Address: *

5. Mobile Number: *

6. Email Address: *

Next of Kin Contact Details:

If you tell us that your mental health has reduced during the study, we may notify your next of kin. This is to ensure you get the support you need. This will be discussed with you first.
These details will be deleted after the study.
Please check that the named person is happy for you to give us their details before filling in this form.

7. Name: *

8. Relation to you (for example, partner, friend, carer, sibling etc.): *

9. Contact Number: *

10. *

I confirm that I have discussed this study with my next of kin and told them why I have provided their contact details.

- ◯ Yes
- ◯ No

GP Contact Details:

11. GP Name (if known):

12. GP Address: *

13. GP Contact Number: *

14. When was your last stroke? Please provide a date in the form DD/MM/YYYY *

The following questions are about how your stroke has impacted you.

Your answers will help us determine if you are eligible to take part.

15. Over the last week, I have felt tense, anxious or nervous. *

- ◯ 0 - Not at all
- ◯ 1 - Only occasionally
- ◯ 2 - Sometimes
- ◯ 3 - Often
- ◯ 4 - Most or all of the time

16. Over the last week, I have felt I have someone to turn to for support when needed. *

- ◯ 0 - Not at all
- ◯ 1 - Only occasionally
- ◯ 2 - Sometimes
- ◯ 3 - Often
- ◯ 4 - Most or all of the time

17. Over the last week, I have felt able to cope when things go wrong. *

- ◯ 0 - Not at all
- ◯ 1 - Only occasionally
- ◯ 2 - Sometimes
- ◯ 3 - Often
- ◯ 4 - Most or all of the time

18. Over the last week, talking to people has felt too much for me. *

- ◯ 0 - Not at all
- ◯ 1 - Only occasionally
- ◯ 2 - Sometimes
- ◯ 3 - Often
- ◯ 4 - Most or all of the time

19. Over the last week, I have felt panic or terror. *

- ◯ 0 - Not at all
- ◯ 1 - Only occasionally
- ◯ 2 - Sometimes
- ◯ 3 - Often
- ◯ 4 - Most or all of the time

20. Over the last week, I made plans to end my life. *

- ◯ 0 - Not at all
- ◯ 1 - Only occasionally
- ◯ 2 - Sometimes
- ◯ 3 - Often
- ◯ 4 - Most or all of the time

21. Over the last week, I have had difficulty getting to sleep or staying asleep. *

- ◯ 0 - Not at all
- ◯ 1 - Only occasionally
- ◯ 2 - Sometimes
- ◯ 3 - Often
- ◯ 4 - Most or all of the time

22. Over the last week, I have felt despairing or hopeless. *

- ◯ 0 - Not at all
- ◯ 1 - Only occasionally
- ◯ 2 - Sometimes
- ◯ 3 - Often
- ◯ 4 - Most or all of the time

23. Over the last week, I have felt unhappy. *

- ◯ 0 - Not at all
- ◯ 1 - Only occasionally
- ◯ 2 - Sometimes
- ◯ 3 - Often
- ◯ 4 - Most or all of the time

24. Over the last week, unwanted images or memories have been distressing me. *

- ◯ 0 - Not at all
- ◯ 1 - Only occasionally
- ◯ 2 - Sometimes
- ◯ 3 - Often
- ◯ 4 - Most or all of the time

25. Are you receiving any rehabilitation such as physiotherapy, speech and language therapy, occupational therapy or psychology? *

- ◯ Yes
- ◯ No

26. Please describe what rehabilitation you are receiving: *

27. Apart from a stroke, have you ever had an injury or illness affecting the brain?

This could include a traumatic brain injury, infection of the nervous system or progressive neurological disease such as multiple sclerosis and motor neurone's disease. *

- ◯ Yes
- ◯ No

28. Please list the injuries or illnesses affecting the brain that you have been diagnosed with: *

29. Apart from what has already been mentioned, have you been diagnosed with any other physical health condition in the last 12 months?

For example, arthritis, heart attack, diabetes etc. *

- ◯ Yes
- ◯ No

30. Please list the physical health conditions that have been diagnosed in the last 12 months. *

31. Have you been diagnosed with a mental health disorder or received support in the past for your mental health? *

- ◯ Yes
- ◯ No

32. Please list the mental health disorders diagnosed and describe the support you have received. *

33. Do you have a severe communication difficulty that means you require help to understand information? *

- ◯ Yes
- ◯ No

34. Please describe your communication difficulties, including how much help you receive. *

35. Do you have any severe cognitive difficulties that means you require help to complete tasks? *

- ◯ Yes
- ◯ No

36. Please describe your cognitive difficulties, including how much help you receive. *

37. Do you have access to a device with a camera? This could include a smartphone, laptop, computer, or tablet. *

- ◯ Yes
- ◯ No

38. Do you have access to a private space with a stable internet connection where you can have a video call? *

- ◯ Yes
- ◯ No

Thank you for completing this form. You can save this survey by clicking 'Export'.
Please click 'Finish' to submit your responses.
If you meet our inclusion criteria, we will be in touch.
If you have any questions in the meantime, please contact the researcher at:
Holly Avery (Trainee Clinical Psychologist): holly.avery@uea.ac.uk

Appendix Q

Email and Text Reminders

Hi ____,

This is a reminder to complete the questionnaire for the ACT study by the end of the day today.

You can access it here: https://app.onlinesurveys.jisc.ac.uk/s/uea/weekly-questionnaire

Please note that all subsequent questionnaires will be on Mondays.

If you have any questions, please let me know.

Thanks.

Kind Regards,
Holly Avery

University of East Anglia

Appendix R

Consent for Intervention Protocol and Materials (Large et al., 2021)

From: Jinnie Ooi (MED - Staff) [redacted]
Sent: 21 May 2024 9:17 AM
To: James Broughton [redacted]; Daryl Harris [redacted]
Cc: Tom Steverson (MED - Staff) <[redacted]>
Subject: Request for the 'ACTivate Your Life after Stroke' Protocol

Some people who received this message don't often get email from [redacted] why this is important

WARNING: This email originated from outside of NHS Wales. Do not open links or attachments unless you know the content is safe.

Hi James and Daryl,

[redacted] We've received an update from Reg Morris that he's heard back from Rebecca and she's happy for us have access to the protocol, and has asked that we get in touch with yourselves. I believe Rebecca will (or has) let you know about this as well.

Looking forward to hearing back from you!

Best wishes,
Jinnie

From: Daryl Harris [redacted]
Sent: Wednesday, June 5, 2024 5:57 PM
To: Jinnie Ooi (MED - Staff [redacted]; Adele Griffiths [redacted]
Cc: Tom Steverson (MED - Staff) <[redacted]>; James Broughton [redacted]
Subject: RE: Request for the 'ACTivate Your Life after Stroke' Protocol

[redacted]

Hi Adele, I'm thinking that it is OK for us to share the manual and materials for the ACT group. It was developed by Reg and Becky. They have given permission.

Regards
Daryl

Appendix S

R Code for Calculating TAU-U and Phase Trend Significance

```
Pt1 <- scdf(values=c(10,15,12,24,7,NA,16,16,17,21,23,21,38), phase_design = c(A=5, B=8), name="participant1")

plot(Pt1)

describe(Pt1)

nap(Pt1)

tau_u(Pt1, method="parker")


df <- as.data.frame(Pt1$participant1)

A <- df$values[df$phase == "A"]

time_A <- df$mt[df$phase == "A"]

cor.test(time_A, A, method = "kendall")


df <- as.data.frame(Pt1$participant1)

B <- df$values[df$phase == "B"]

time_B <- df$mt[df$phase == "B"]

cor.test(time_B, B, method = "kendall")
```

Appendix T

CompACT-10 Descriptives Statistics Table

Participant	Phase	Observations (n)	Mean	Standard Deviation	Range
1	Baseline	5	13.60	6.50	7-24
	Intervention	7	21.71	7.70	16-38
2	Baseline	6	25.33	2.73	21-28
	Intervention	8	27	1.51	24-29
3	Baseline	6*	26.57	4.13	17-28
	Intervention	6	21.83	1.32	20-24
4	Baseline	7	18.86	2.61	16-24
	Intervention	8	22.75	5.01	16-32
5	Baseline	7	23.57	3.10	20-28
	Intervention	6	20.50	3.94	15-25

Note: * Baseline week five questionnaire was completed three days after the planned date.