Purpose: A randomised controlled feasibility trial (RCT) to explore the feasibility of delivering and testing a visual arts programme within stroke rehabilitation.

Methods: Stroke survivors receiving in-patient rehabilitation were randomised a Creative Engagement Intervention (CEI) group (n=41) or a usual care group (n=40). Recruitment, retention, preference for art participation and change in selected outcomes were evaluated at end of intervention (T2) and three month follow-up (T3).

Recruitment rate was 29%. 88% (n=71) of participants completed T2 and 77% (n=62) T3 assessments. Of eight CEI group non-completers at T2, six had no preference for art participation. Outcome measure completion varied between 97% and 77%. Running groups at different sites was difficult because of randomisation timing. Between T1-T2 and T2-T3 CEI group change scores were greater for Emotion, Positive and Negative Affect Schedule (PANAS) and Self-efficacy for Art (SEfA). Effect sizes favoured the CEI group for SEfA and PANAS at T2 and T3 and PANAS at T2 and T3 (d=0.24-0.42) .

Conclusions: Delivering and testing an art programme within stroke rehabilitation is feasible but a cluster RCT would avoid difficulties convening art groups. Fewer measures, and better retention strategies are required**.** Art participation may enhance art self-efficacy and affect.

Introduction

Stroke is the main cause of complex adult disability Annually 16 million people worldwide experience stroke[1] of whom 85% experience motor, cognitive or communication impairments[2]. These limit independence in activities of daily living (ADL) and restrict participation in life roles[2] Around 31% of survivors experience post-stroke depression within five years post-stroke[3]. Along with physical impairments, the psychosocial impact of stroke including depression, lower optimism, self-esteem, perceived control, and social support are associated with poorer psychosocial wellbeing and quality of life [4].

Wellbeing is viewed as balance between physical, psychological and social resources, and challenges to those resources[5]. Stroke presents a challenge to the balance, causing sudden and unexpected threats to resources that negatively influence wellbeing. Kirkevold [6,7] suggests wellbeing after stroke depends on mood, engagement in meaningful activities, good social relations, self-esteem and belief in own abilities. Finding ways to improve wellbeing after stroke within rehabilitation by addressing these factors is therefore vital.

Benefits of participating in meaningful leisure activities, to address wellbeing, are becoming recognised[8]. The importance of arts in healthcare is reflected in international healthcare policy documents [9,10] . Models of psychological care after stroke[11] suggest activities including art participation within stroke rehabilitation, may enhance wellbeing, preventing escalation to more serious psychological problems. Arts programmes led by professional artists focus on benefits to wellbeing through artwork creation. These are open to all survivors and are not psychotherapeutic art therapy for specific psychological problems. Despite recent endorsement of art participation in healthcare models and policy, research evidence supporting effects of art participation on wellbeing after stroke is scant.

Two qualitative studies[12,13], respectively involving sixteen and six survivors receiving in-patient rehabilitation suggest that wellbeing, rehabilitation goal achievement and renewed identity are benefits of arts participation. Two others[14,15], respectively involving 20 and 24 community dwelling stroke survivors, suggest art participation may enhance self-esteem, self-efficacy and confidence. Despite these positive reports, the diverse range of reported benefits means that defining measures for evaluation of effects is challenging. We found only one RCT of art participation within stroke rehabilitation involving 118 in-patient stroke survivors[16]. The study demonstrated improved depression, quality of life and cognition, compared to usual care, following visual art-making combined with meditation and singing. However, it is unclear how each intervention component contributed to effects, therefore specifically evaluating effects of artmaking is warranted.

The Creative Engagement Intervention (CEI) is a person-centred arts participation programme delivered within a Scottish health board, and developed collaboratively with artists, academics and stroke survivors. In planning this study, we interviewed three artists who delivered that programme and eleven previous participants[17]. Findings showed the CEI enhanced sense of hope, self-efficacy and perceived control over recovery as central components of enhanced wellbeing. Other benefits included physical and communication recovery, self-esteem and mood. These benefits can be translated into measurable outcomes, congruent with models of wellbeing, as described within our related intervention model [17]. The qualitative work facilitated modelling of the existing intervention into a protocol for use in a randomised controlled feasibility trial.

Feasibility trials examine key trial parameters, such as intervention feasibility, recruitment, loss to follow-up, completion and relevance of outcome measures, to optimise a subsequent large-scale RCT. They also evaluate if proceeding to full-scale trial

is appropriate [18]. Undertaking a feasibility evaluation of art participation is critical to inform a future trial, since so few RCTs exist.

This study aimed examined feasibility of an RCT of a visual arts based creative engagement intervention (CEI) within in-patient stroke rehabilitation. We aimed to examine participant recruitment and retention rates, and because art participation may have limited appeal, to examine if preference for art participation influenced retention. A further aim was to explore magnitude and direction of change in selected psychosocial outcome measures to determine if progress to a large scale trial was warranted.

Design

This pragmatic single-blind feasibility randomised controlled trial was informed by the Medical Research Council Framework for Complex Intervention Development[19]. The published study protocol provides in-depth methodological details[20]. We provide a brief description below.

Methods

East of Scotland Research Ethics Service provided approval: ref. no. 13/ES/0006. Clinicaltrials.gov. Registration number: NCT02085226

Participants and setting

People diagnosed with stroke admitted to two stroke rehabilitation units in North East Scotland were screened for trial inclusion within one week of admission to rehabilitation, typically less than two weeks after stroke onset. Two study researchers, the research manager, also an artist, researcher and co-author (CK) – and a psychologist (MT)

conducted screening and obtained informed consent for participation from interested stroke survivors.

Medically stable survivors participating in usual rehabilitation therapies and with planned rehabilitation duration of at least three weeks were considered eligible. Stroke survivors with transient ischaemic attack; who were unconscious; medically unwell; unable to participate in usual rehabilitation activities or to provide informed consent, were excluded.

Sample size calculation

Formal sample size calculation was not conducted, as this was a feasibility study. The sample size, of 40 participants per group, was based on guidance that a sample of that size would provide sufficiently precise estimates of direction and magnitude of effects and of variability for later sample size calculation for a full-scale trial[21].

Randomisation

Randomisation to usual care or intervention was conducted after baseline assessment using secure, remote, web-based, concealed computer generated randomisation. Minimisation was applied to ensure that groups were balanced. Participants were recruited from two stroke units, therefore to minimise the effects of factors within units that might affect outcomes, we included stroke unit as a minimising factor as well as age (≤60 years, 61-80 years, ≥81 years), gender, and likelihood of ADL independence, according to Barthel Index scores[22], grouped as scores of 0-40, 45-55, 60-100[23].

Intervention Group

Participants randomised to the intervention group received the modelled visual arts based CEI in addition to usual rehabilitation. Two qualified visual artists, with five and seven years of experience respectively of working in healthcare settings, delivered the

128 CEI. The research manager (CK), a trained artist and researcher, trained the artists and
129 assessed their performance of trial procedures, delivery of intervention stages, goal
130 setting with participants, and progress review, prior to study commencement. Planned
131 intervention delivery involved one session per week with the artist and one group session
132 with other participants, to a maximum of eight sessions, because of known benefits of
133 each approach [12,14,24] . Individual sessions lasted one hour and group sessions one hour
134 and thirty minutes. Usual rehabilitation typically involved physiotherapy, occupational
135 therapy, and as necessary, speech and language therapy. Approximately one half hour
136 session was delivered by each therapy on most weekdays.

137

138 The CEI was targeted at individual survivors and included three components that we had
139 identified as central mechanisms of action[17]: *Social Context* for art participation - the
140 social setting of the group or individual sessions with the artist; *Art-making Processes* -
141 art-making itself, individually tailored to participants' needs and interests and *Creative*
142 *Output* – the finished product. Art-making involved five carefully defined stages, allowing
143 intervention replication, whilst facilitating tailoring of activities and materials to
144 participants' interests and abilities. Participants could repeat stages several times,
145 depending on progress. Full intervention details according to TIDIER guidelines[25] are
146 reported elsewhere[20]. Intervention Stages are provided in Table 1

Table 1. Intervention Stages	**Details**
1. *Define initial creative goals.*	Artist meets participant to elicit information about their health and stroke-related impairments, to discuss interests and preferences
2. *Introduction to materials and mark making*	Ability to handle art materials ascertained during introductory work with materials. [drawing/collage/printing/painting/mixed-media techniques].
3. *From materials and mark making to developing personal project ideas and goals.*	Content or subjects of personal interest considered.
4. *Developing personal project ideas into creative finished pieces.*	Expression of content and creative interpretation facilitated by the artist.

5. *Review of completed work, mounting and display of work, celebration and future plans*	Completed creative piece of work as tangible output; further ideas progressed by repetition of intervention stages, facilitated by the artist

147

148 ***Control Group***

149 Control participants received usual stroke rehabilitation. To maintain participants'
150 interest in the study and reflect usual practice within those units, after baseline
151 assessment and randomisation, a portfolio of work produced by previous participants of
152 the Tayside CEI was provided to the control group, which provided details of available
153 community programmes for post-discharge participation. At final outcome assessment,
154 study researchers discussed options for participation in community art programmes.

155

156 ***Measures and measurement instruments***

157 Measures at baseline included age, gender, stroke type (ischaemic/haemorrhagic) and
158 side , as well as the Barthel Index [22]; Montreal Cognitive Assessment [26] ; NIH Stroke Scale
159 [27]; Edinburgh Handedness Inventory [28]; Communication: Aphasia Severity Rating Scale [29]

160

161 Our qualitative work suggested art participation may foster positive resources that
162 contribute to wellbeing. Secondary outcome measures examined positive or negative
163 psychological dispositions rather than absence or presence of clinical disorders such as
164 anxiety and depression. Consultation with stroke survivors led to our final choice of
165 outcome measures for evaluation in this feasibility study. Detailed scoring and
166 psychometric properties are described in the trial protocol [30].

167

168 The Stroke Impact Scale questionnaire [31] was selected as a potential primary outcome
169 measure. It measures stroke related quality of life [32]. We examined Emotion, Hand
170 Function, Communication and Social Participation, given those domains were relevant

171 from our earlier work[17,20]. Items are rated on a five-point Likert scale indicating
172 difficulty completing the item. Summative scores for domains range from 0 to 100.
173
174 The Positive and Negative Affect Schedule[33] (PANAS) measured emotional wellbeing. The
175 focus on positive affect reflects our definition of wellbeing and the potential impact of art.
176 Positive affect represents pleasurable engagement and includes emotions such as
177 enthusiasm and alertness. Negative affect is characterised by subjective distress and un-
178 pleasurable engagement. Items are scored on a five-point scale [1-5], higher scores
179 indicate higher emotion. Total scores range from 10 to 50. The scale has high validity and
180 reliability for use in rehabilitation.
181
182 Our study and others indicated that art participation may enhance self-esteem[14]. The
183 Visual Analogue Self-esteem Scale[34] was developed for people with aphasia, and was
184 accessible to our participants. Visually represented constructs are rated on a scale of 1-5.
185 Item responses are summed providing a total score between 10 and 50.

186 Control over recovery was indicated as a positive benefit of art participation [17]. The
187 stroke specific Recovery Locus of Control Scale assessed this domain[35]. It is a nine-item
188 scale measuring internal and external control beliefs relating to recovery. Degree of
189 control is rated between 1 and 5. Summed items indicate strength of internal control, with
190 9 indicating minimum and 45 maximum.

191 Hope predicts recovery after stroke[36]. The Trait Hope Scale reflects hope of achieving
192 broader life goals, an outcome that was attributed to art participation in our previous
193 study[17]. It is a 12-item measure with four item subscales of agency and pathway. Pathway
194 focuses on routes to achievement of goals; and agency focuses on motivation and
195 confidence to achieve them. Items are scored on a four-point Likert scale. The domains of

196 the measure captured mechanisms, suggested in our previous study, through which art
197 participation might provide hope.
198
199 *General self-efficacy:* Art making appeared to develop confidence to achieve art-specific
200 goal achievement *and* personal rehabilitation goals[14,17]. To capture general confidence
201 we included the General Self-Efficacy Scale[37], a 10-item scale assessing confidence to deal
202 with life demands. Responses are scored 1-4 and summed to a total of 40, indicating
203 maximum self-efficacy. The scale is widely used with stroke populations.
204
205 *Self-efficacy for art:* To assess self-efficacy for art we asked two single item questions,
206 using an established procedure [38]. The questions are: 1. How confident are you that you
207 can express yourself through art activities? 2. How difficult do you find it to express
208 yourself through art activities? Self-efficacy for art expression is scored on a seven-point
209 vertical visual analogue scale with one as least confident/difficult and seven as most
210 confident/difficult.
211
212 Because art participation may not appeal to all, preference for randomisation to doing or
213 viewing art, or no preference, was assessed using a simple question after randomisation.

214 Number of eligible participants, recruitment, retention, preference for art participation
215 and follow-up rates were also collected.

216 ***Trial Procedures***

217 As per local ethical regulations, nursing and rehabilitation staff identified potential
218 participants and provided them with study information. Those expressing interest were
219 screened by the research team and written informed consent for participation obtained.
220 Baseline measures were collected and participant details entered into a secure, remote,

web-based randomisation system then artists were informed of group allocation. The system was password accesses only by the study team.

An assessor trained in measures and blind to group allocation conducted outcome (T2) and follow-up (T3) assessments. CEI group T2 assessment was conducted after eight art sessions – or hospital discharge if sooner. Control group T2 outcomes were assessed at four weeks, or discharge if sooner. Participants were instructed not to reveal group allocation to the assessor. T3 assessment was undertaken three months after T2 assessment in hospital or participants' homes depending on discharge status.

Twelve participants and twelve rehabilitation staff were invited to participate in audio-recorded interviews after follow-up assessment to evaluate experiences of trial participation.

Data analysis

We examined proportions of survivors who were eligible, who provided consent to participate who dropped out and who had different preferences for art participation. We also described within-group change and between-group differences to inform primary outcome measure selection for a full-scale trial, however evaluation of treatment effectiveness was a secondary outcome, so statistical analysis was kept to a minimum. Data were screened for normality and transformed where required. Data for continuous outcome measures were assessed for normality prior to analysis. Where data was found to be non-normally distributed, right-skewed data were transformed by logarithm (base e) to achieve a normal distribution, while left-skewed data was transformed by squaring. Where transformation led to a normal distribution, the transformed data were analysed as a sensitivity analysis to confirm the original analysis.

Data were summarised and changes from baseline calculated. To assess variability, magnitude and direction of mean between group difference at T2 and T3 was conducted using analysis of covariance (ANCOVA), adjusting for baseline co-variates, and 95% confidence intervals for the difference were recorded. Cohen's d effect size was calculated by dividing group means at T2 and T3 by the pooled standard deviation. The statistician undertaking analysis was blinded to group status until after the main analysis was conducted. Data were stored in accordance with the UK Data Protection Act[39].

Results

Recruitment

Over 12 months, we screened 284 stroke survivors admitted to rehabilitation units for eligibility. Of those, 117 (41%) were eligible, but chose not to participate. 86 (30%) were not eligible for a range of medical reasons. 81 (29%) provided informed consent for participation. We randomised 41 to receive CEI, and 40 to usual care. Reasons for exclusion are reported in figure 1, and participant characteristics of dropouts and completers are presented in table 1.

Insert figure 1 about here

Insert table 1 about here

Retention

Eight CEI (20%) and two control participants (5%) dropped out before T2. Six CEI group dropouts expressed no preference, or preferred the control option of art viewing. Although numbers were insufficient for statistical testing, baseline primary outcome measure scores for CEI group dropouts were higher at T1 (n=8) compared to T2

completers (table 2), suggesting dropouts might differ in some ways from those remaining in the study.

Insert table 2 about here

At T3 three further CEI participants and six control participants were lost to follow-up, leaving a CEI group completion rate of 73% (n=30/41) and control group of 80% (n=32/40).

The number of art sessions (Mean, Standard Deviation) received by the intervention group was 5.7 ±2.5. However, frequently only one participant per unit was randomised to receive art at any time, therefore participants received fewer group sessions (2.5±1.5) than one to one sessions (4.1±1.9)

Outcomes

Data transformation was only used for two outcomes, The SIS Emotion and Communication scales at T3, which were skewed towards lower scores. These were transformed by squaring (score**2). All others were close to normal distribution.

Groups were well matched in terms of baseline characteristics and T1 scores on the outcomes of interest (tables 2 and 3). 97% of participants completed all items on outcome measures at baseline, except for the Adult Dispositional Hope Scale, where full completion was only 86.5% and Recovery Locus of Control Scale where full completion was 77%. Participants reported these measures as difficult to understand and too long.

Change from baseline

For the selected Stroke Impact Scale subscales, participants completing the intervention in the CEI group had higher change scores (Mean, Standard Deviation) than the control

group between T1 and T2 in Social Participation (3.4±27.7 vs -2.7 ± 34.0), Emotion (5.8±23.9 vs 5.3±18.5) and Hand Function (26.7±31.9 vs 25.7 ± 35.2) (table 3). However, differences were small and variability was high. For communication, change was negative between T1 and T2, with greatest decline in the CEI group (-10.1±24.9 vs -1.4±17.2). For secondary outcomes the CI group had greatest improvement in Positive Affect (5.4±9.2 vs1.7±9.9), lower increase in Negative Affect (3.2±10.8 vs 4.5±9.4) (table 3), and most improvement in self-efficacy for art (5.4±9.2 vs 1.79±9.9). For all other measures change was small and fairly equitable between groups (table 3). Mean between group differences at T2 reflected the pattern for change scores. For self-efficacy for art (mean difference = 2.6; 95% CI = 1.1 to 4.2; Cohen's d =0.35) mean difference favoured the intervention group; and for self-esteem (mean difference = 4.3; 95% CI = -7.3 to -1.3, Cohen's d = -0.51) and communication (mean difference = 6.4; 95% CI = -14.5 to 3.2; Cohen's d = -0.54) the mean difference favoured the control group (table 3).

Insert table 3 about here

For overall change T1 to T3 on the Stroke Impact Scale (table 4), the control group demonstrated most improvement on all domains except Emotion, where the change score was slightly greater for the intervention group (3.9±19.1 vs 3.5±20.8). Greater improvement for the intervention group for positive affect (4.3±7.5 vs 2.8±10.1) and lower increase in negative affect (3.3±11.0 vs 5.2±9.8) was maintained for overall change. The intervention group demonstrated greatest overall change in self-efficacy for art (2.1±4.1 vs 0.4±3.9), otherwise change in both groups was small and similar across the groups (table 4).

Insert table 4 about here

In terms of estimated mean differences at T3, the pattern was similar to T2, favouring the CEI group for hand function, social participation, positive and negative affect and self-efficacy for art (table 4). Although small to moderate, effect size favoured self-efficacy for

art in the CEI group (mean difference =2.1; 95% CI = 0.4 to 3.8; Cohen's d = 3.0) and the general self-efficacy significantly in the control group (mean difference = 3.0; 95%CI =-5.9 to -0.2; Cohen's d = -0.28). Other outcomes showed very small effect sizes, most favouring the control group.

Discussion

Conducting an RCT to test a visual arts intervention within stroke rehabilitation was feasible. Recruitment and retention were comparable to other stroke rehabilitation trials [40,41], however preference for art may influence study retention. The study was not designed to definitively evaluate effectiveness, but indicated that expected changes in the nominated primary outcome were not realised, but that positive affect and self-efficacy for art, may be improved.

Recruitment and retention

At 29%, recruitment reflected previous art programmes, suggesting participation in the study did not negatively influence recruitment. The 20% drop-out rate at T2 (n=8/41) for CEI was high and, and baseline scores were high for those dropping out. Most were ambivalent about art participation, possibly perceiving little need to participate. Findings indicate incorporating preference for group allocation into trial design, may enhance retention, and facilitate evaluation of preference on outcomes[42].

Completion rates on some measures were low. The test battery was long and considered repetitive. A full trial should include fewer measures, examining only salient outcomes highlighted by this study.

Group participation

Our difficulty running groups limited opportunities for interaction between survivors. Despite this, change in SIS Social Participation was greater for the CEI group, supporting the hypothesis that art participation may enhance well-being via social interaction [14,17,43-45]. A large-scale trial should randomise by clusters to ensure sufficient participants at individual sites to run groups. This design would facilitate evaluation of effects of group and individual sessions, and more robustly evaluate impact on social participation.

Potential Effects

The study only provided indications of magnitude and direction of change and was not a definitive effectiveness study. Between-group differences were small and variability high, however change in positive and negative affect favoured CEI indicating art participation may positively shift emotions.

The RCT of art participation with stroke survivors in Thailand[16] showed improved depression and quality of life compared to controls receiving physiotherapy only. The small effect sizes in our study probably reflect low study power, but may mean intervention adjustment, or additional activities such as singing and meditation, are indeed necessary for effectiveness. Our CEI involved choice and development of personally meaningful artwork, but activities in that study were more prescribed and pre-determined, making direct comparison difficult.

One study aim was to identify relevant outcome measures. PANAS reflected our positive definition of wellbeing, however it may be insensitive to change in lower emotional arousal states[46] and we may have missed intervention effects by not measuring

depression and anxiety. Despite these limitations, both studies indicate art may positively influence mood and affect after stroke, suggesting a full-scale trial, with mood as primary outcome, is probably warranted.

In our study, SIS communication scales worsened over time. Whilst art sessions naturally support conversation, compared to formal approaches to conversation facilitation[47], communication was unstructured and incidental. The art intervention is thus unlikely to influence perceived communication, which should not be an outcome within a full-scale trial.

General self-efficacy, self-esteem and hope are associated with better stroke recovery [48,49]. Art participation appeared not to influence these outcomes. High variability in scores and limited sensitivity to change in the measures may explain findings. We may also have over-interpreted our qualitative findings when selecting relevant measures and these outcomes may simply not be relevant to this intervention.

As expected, self-efficacy for art was higher in the intervention group at T2 and T3, and, as predicted by Bandura's Social Cognitive Theory[41], illustrates confidence and mastery through specific skills development. Self-efficacy that translated to broader life activities was a key benefit identified in several qualitative art participation studies [12,14,17]. We found no indication, however, that general self-efficacy was influenced by art participation, suggesting, as predicted by Bandura, that self-efficacy is specific to mastery of particular activities. Longer exposure to art making within other qualitative studies[12,14], may have promoted perceptions of enhanced general self-efficacy over time, that were not realised in the short timescale of this study.

Limitations

We did not measure baseline levels of depression to examine if those with initial depression improved more. A future trial should include this evaluation, to determine participants most likely to benefit. Furthermore, the control group received an art portfolio because usual practice on those units was to have artwork available from previous CEI cohorts. We also viewed it as an inert intervention to maintain study participation. However, it may have confounded effects. A future trial should include usual intervention controls only. We did not measure group dynamics or identity, which may clarify intervention mechanisms of action. These should be included for a full-scale trial.

Conclusion

Delivering and testing an art intervention in stroke rehabilitation was feasible. Art participation *may* enhance positive affect, social participation and self-efficacy for art, however study adjustments are important for a full trial. These include a targeted test battery and change of primary outcome to affect, a preference study design and detailed screening to ensure participants are interested in art participation and complete the intervention. A cluster or stepped wedge design with site level randomisation would guarantee group sessions. Given the intervention may improve positive affect, it could be enhanced to specifically target improvement in this domain, and should be the primary outcome for a future study. Whilst retaining the primary purpose of a creative experience with artists, elements of art therapy, particularly techniques known to be effective at improving mood and affect could be included.

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figure 1. Consort Diagram

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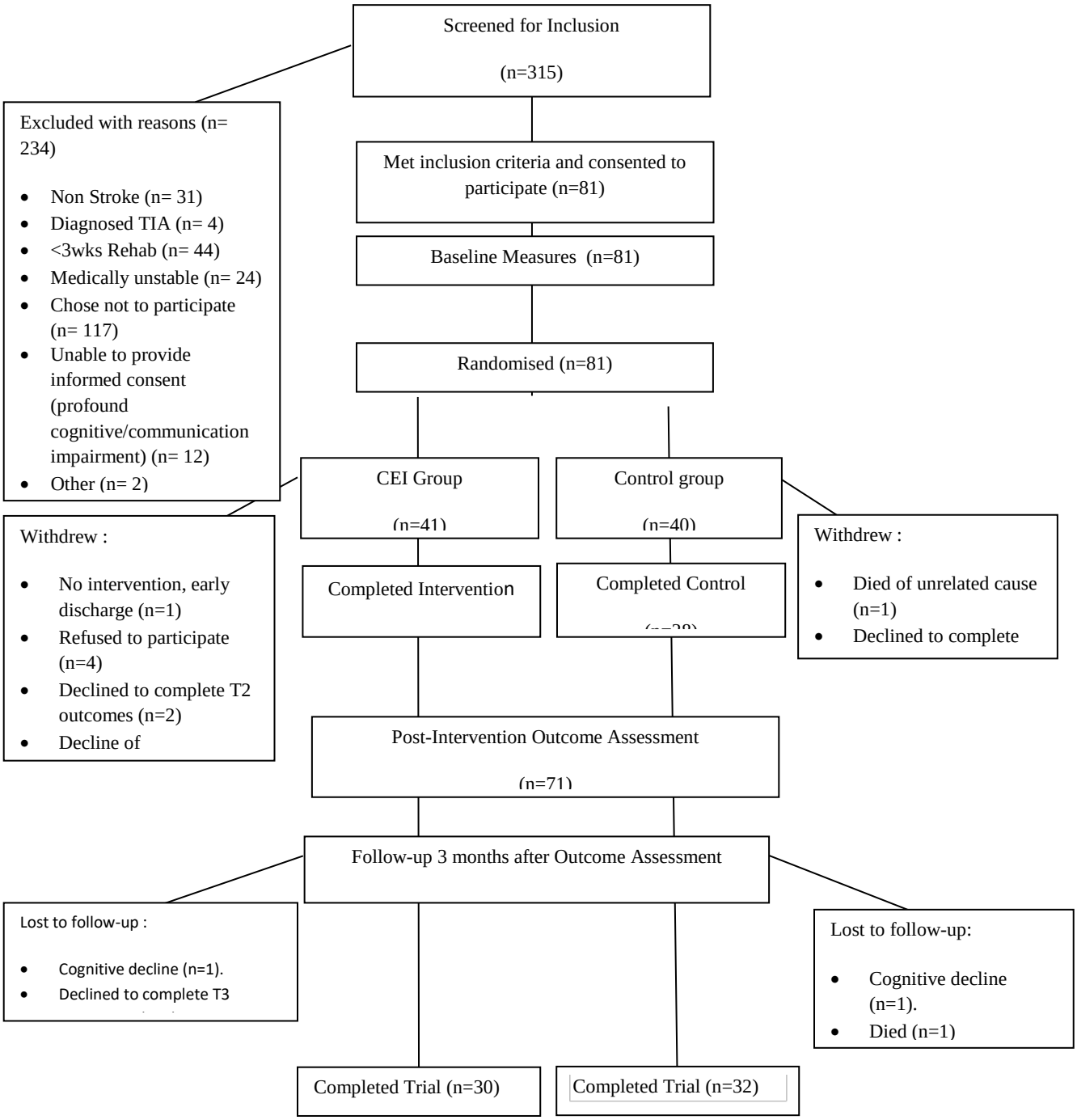

Baseline Characteristics	CEI Group (n= 41)	Control Group (n= 40)
Days admission to randomisation (mean, SD)	11.2(7.6)	12.4(9.5)
Age (years)(mean, SD)	77.0(9.1)	75.6(8.8)
Male, n (%)	19(46%)	17(42%)
Female, n (%)	22(54%)	23(58%)
Ischaemic stroke, n (%)	36(88%)	35(87%)
Haemorrhagic stroke, n (%)	5(12%)	5(13%)
Edinburgh Handedness Inventory, n (%)		
Left Handed	3(7)	6(15)
Ambidextrous	2(5)	1(2.5)
Right handed	36(88)	33(82)
Side of hemiplegia, n (%)		
Left hemiplegia	22(54%)	23(57%)
Right hemiplegia	19(46%)	16(43%)
NIH Stroke Scale (max=15) (mean, SD)	5.4(3.3)	5.2(3.7)
Montreal Cognitive Assessment (max=30)(mean, SD)	18.4(5.4)	18.4(6.6)
Barthel Index (Max=100)	46.2(24.7)	46.0(26.8)
On Psychotropic Drugs n (%)	2(5%)	1(2.5%)
Intervention Sessions (Max=8)(mean, SD)	5.6(2.6)	-
Preference for Art, n (%)		
View	9(22)	9(23)
Participate	18(44)	15(37)
None	14(34)	16(40)
Experience of Art, n (%)		
None	22(54)	27(67)
A little	17(41)	12(30)
A lot	2(5)	1(3)

table 2**.** Baseline T1 scores on outcome measures, Mean, SD: CEI Group, Control Group, dropouts at T2 assessment.

Outcome Measures	**T1 score (mean, SD)**		**Dropouts**	
	CEI Group (n= 41)	Control Group (n=40)	CEI Group (n= 8)	Control Group (n=2)
Stroke Impact Scale (Min=0, Max=100)				
Emotion	69.6(19.5)	72.4(20.4)	87.6(9.5)	77.8(31.4)
Communication	75.5(21.6)	69.5(24.9)	73.2(16.1)	32.1(5.0)
Hand Function	16.1(27.3)	17.1(26.8)	52.0(30.3)	30.0 (0.0)
Social Participation	37.0(26.5)	39.5(26.3)	54.7(25.8)	18.7(0.0)
Positive and Negative Affect Schedule (min=0, max=50)				
Positive Affect (higher score better)	23.5(8.2)	24.3(7.8)	27.9 (7.1)	27.5 (2.1)
Negative Affect (lower score better)	20.2(7.8)	20.4 (8.1)	13.0(2.9)	15.5 (7.8)
Visual Analogue Self-Esteem Score (min=0, max=50)	37.6(7.6)	37.4(8.5)	43.9(3.9)	40.0 (12.7)
Adult Dispositional Hope Scale (min=8, max=64)	25.9(3.0)	26.4(3.7)	26.9(2.6)	25.0(7.1)
General Self-efficacy Scale (min=10, max=40)	31.4(5.0)	32.5(4.3)	32.1(5.4)	27.0(7.1)
Self-efficacy for Art (min=2, max=14)	6.7(3.5)	6.1(3.6)	4.7(2.6)	6.0(2.8)
Recovery Locus of Control Scale (min=9, max=45)	36.4(5.1)	35.5(6.4)	38.8(2.68)	34.0 (0.0)
Preference for ART Participation (n)				
No preference			3	1
Preference not met			3	1
Preference met			2	-

table 3. Mean (SD) Change scores T1 to T2; estimated between group differences and effect size estimation at T2

Outcome Measures	**Change T1 to T2 (mean, SD)**		**Estimated Between Group Difference at T2**		**Standarised Effect Size**
	CEI Group (n= 33)	Control Group (n=38)	Estimated mean difference T2	95% Confidence Interval	Cohen's d (positive value favours CEI)
Stroke Impact Scale (Min=0, Max=100)					
Emotion	5.8(23.9)	5.3(18.5)	2.8	-11.3 to 5.7	-0.35
Communication	-10.1(24.9)	-1.4 (17.2)	6.4	-14.5 to 3.2	-0.54
Hand Function	26.7(31.9)	25.7(35.2)	0.5	-14.4 to 13.4	-0.05
Social Participation	3.4(27.7)	-2.7(34.0)	0.1	-10.5 to 10.8 to 5.8	0.01
Positive and Negative Affect Schedule(min=0, max=50)					
Positive Affect (higher score better)	5.4(9.2)	1.7(9.9)	1.6	-2.2 to 5.3	0.24
Negative Affect (lower score better)	3.2(10.8)	4.5(9.4)	3.0	-0.7 to 6.7	0.42
Visual Analogue Self-Esteem Score(min=0, max=50)	-0.4 (6.7)	2.1(8.4)	4.3	-7.3 to -1.3	-0.51
Adult Dispositional Hope Scale (min=8, max=64)	-0.9(3.5)	1.5(4.9)	0.8	-3.2 to 1.5	-0.12
General Self-efficacy Scale (min=10, max=40)	-2.6(7.1)	1.5(6.6)	2.5	-5.8 to 0.7	-0.28
Self-efficacy for Art (min=2, max=14)	1.4(4.1)	0.4(3.7)	2.6	1.12 to 4.2	0.35
Recovery Locus of Control Scale (min=9, max=45)	1.3(6.7)	1.2(6.6)	0.4	-3.22 to 2.4	0.06

SD denotes standard deviation

Outcome Measures	**Change T1 to T3 (mean, SD)**		**Estimated Between Group Difference at T3**		**Standarised Effect Size**
	CEI Group (n= 33)	Control Group (n=38)	Estimated Mean Difference T3	95% Confidence Interval	Cohen's d (positive value favours intervention)
Stroke Impact Scale (Min=0, Max=100)					
Emotion	3.9 (19.1)	3.5(20.8)	2.3	-10.3 to 5.8	-0.18
Communication	1.1 (21.8)	9.3(21.8)	4.4	-13.9 to 5.2	-0.11
Hand Function	29.8 (31.3)	34.5(41.3)	2.2	-20.5 to 15.7	-0.12
Social Participation	18.3 (30.3)	19.5(33.9)	5.2	-18.8 to 8.3	-0.17
Positive and Negative Affect Schedule(min=0, max=50)					
Positive Affect (higher score better)	4.3(7.5)	2.8(10.1)	0.5	-4.5 to 3.4	0.07
Negative Affect (lower score better)	3.3(11.0)	5.2 (9.8)	3.0	-0.4 to 6.4	0.18
Visual Analogue Self-Esteem Score (min=0, max=50)	-0.3(6.6)	-0.2(7.5)	1.9	-5.1 to 1.2	-0.06
Adult Dispositional Hope Scale (min=8, max=64)	-0.7(3.8)	-1.7(5.1)	0.4	-2.5 to 1.7	-0.06
General Self-efficacy Scale (min=10, max=40)	-2.0(6.4)	-0.7(6.5)	3.0	-5.9 to -0.2	-0.28
Self-efficacy for Art (min=2, max=14)	2.1(4.1)	0.4(3.9)	2.1	0.4 to 3.8	0.30
Recovery Locus of Control Scale (min=9, max=45)	0.7(7.7)	1.3(7.9)	0.7	-2.4 to 3.7	-0.09

SD denotes standard deviation

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Declaration of Interest Statement

The authors report no conflicts of interest.