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Fidelity to a motivational interviewing intervention for those with post-stroke aphasia: A small scale feasibility study

Abstract

Objective: Depression after stroke is common, and talk-based psychological therapies can be a useful intervention. Whilst a third of stroke survivors will experience communication difficulties impeding participation in talk-based therapies, little guidance exists to guide delivery for those with aphasia. We need to understand how to adapt talk-based therapies in the presence of aphasia. This study aimed to explore the feasibility of motivational interviewing (MI) in people with post-stroke aphasia.

Methods: In a small-scale feasibility study, consecutive patients admitted to an acute stroke ward were screened for eligibility. People with moderate to severe aphasia were eligible. Those consenting received an intervention consisting of up to eight MI sessions delivered twice per week over four weeks. Sessions were modified using aids and adaptations for aphasia. Session quality was measured using the Motivational Interviewing Skills Code (MISC) to assess MI fidelity.

Results: Three consenting patients identified early post-stroke took part; one male and two females ages ranging between 40s to 80s. Participants attended between five to eight MI sessions over four weeks. Aids and adaptations included visual cues, rating scales and modified reflections incorporating verbal and non-verbal behaviours. Sessions were tailored to individual participant need. Threshold MISC ratings could be achieved for all participants however, ratings were reduced when aids and adaptations were not used.

Discussion: This small-scale feasibility study suggests that it is feasible to adapt MI for people with moderate to severe post-stroke aphasia. These findings merit further exploration of adapted MI as an intervention for this patient group.

Key words: Stroke; Stroke survivors; Aphasia; Motivational interviewing; Feasibility studies.

25 Introduction

26 Stroke recovery requires emotional adjustment, and depression post-stroke is common, with a third
27 of stroke survivors experiencing symptoms [1]. Post-stroke depression is an independent predictor
28 of recovery and quality of life [2], therefore early prevention and treatment is vital. A review of
29 interventions for preventing depression post-stroke found psychotherapeutic interventions to be
30 more effective than pharmacological [3]. However, talk-based therapies may need adjusting for
31 those post-stroke, who can suffer from cognitive or communication difficulties. Whilst a third of
32 stroke survivors will experience communication difficulties [4] impeding participation in talk-based
33 therapies, little guidance exists on delivery in people with aphasia. We need to understand how to
34 adapt talk-based therapies in the presence of aphasia.

35 Motivational interviewing (MI) is a talk-based therapy that has been shown to benefit patient mood
36 post-stroke [5]. MI principles were used to increase awareness of the importance of changing what
37 people make of their situation (adjustment), through amplifying the discrepancy between their
38 current concerns and future goals or personal values and current approaches to addressing them. By
39 reducing ambivalence and strengthening motivation, therapists explore a person's reason for
40 changing what they make of their situation. Confidence to adjust to their current state is reinforced
41 through supporting self-efficacy, enabling the person to develop motivation, and creating readiness
42 to adjust [6]. Specific MI consistent techniques allow delivery of these principles; asking open
43 questions, reflecting statements, providing affirmations and summarising. MI inconsistent
44 techniques include, confronting people or giving advice without permission. Whilst data from this
45 study seemed to indicate a particular benefit for those with mild aphasia [5], it is unclear whether it
46 is possible in those with moderate to severe aphasia. Furthermore, if the delivery of MI needs
47 adjustments, it is not known whether an adapted form of MI can maintain core MI principles.

48 MI has previously been adapted for other populations including learning disabilities [7]. A pilot study
49 of people with learning disabilities and alcohol dependency who experienced communication
50 difficulties, incorporated adaptations including reading aloud materials for those unable to read, and

51 providing regular summaries of topics discussed. Visual analogue scales were used to rate the
52 importance of, or confidence in, a topic; an MI strategy usually discussed verbally. These aids and
53 adaptations improved patients' understanding. While the delivery of MI with people with learning
54 difficulties may differ to those experiencing post-stroke aphasia, some adaptations used may be
55 useful post-stroke.

56 More widely, methods to facilitate the participation of people with communication difficulties in
57 research has involved using words and/or pictures to visualise information [8], incorporating non-
58 verbal behaviour, simplifying questions, supporting comprehension and expression, checking that
59 participants have been understood correctly [9] and training communication partners [10]. Aids and
60 adaptations can facilitate communication for people who may struggle verbally, making it possible
61 for people with aphasia to participate in a talk-based therapy. To date, despite data suggesting a
62 potential benefit of MI to people with aphasia post-stroke [5], no study has explored the feasibility
63 of how to adapt MI for this group.

64 A systematic review of interventions to prevent and treat depression in those with post-stroke
65 aphasia [11] found various interventions that could be considered for those with sub-threshold to
66 mild depression. However, the review highlighted a need to strengthen the evidence base and adapt
67 preventative and treatment interventions. In order to do this, trials must be reported in a way that
68 allows study replication and comparisons [11, 12]. However when adapting talk-based therapies, it is
69 important that the adapted intervention maintains fidelity to the core principles of the therapy.
70 Treatment fidelity builds confidence that changes to the dependent variable are attributable to the
71 independent variable, in this case the talk-based therapy. This can be measured using various factors
72 (design, training, delivery, receipt and enactment) [12].

73 This small-scale study aimed to explore the feasibility of delivering MI to people with moderate to
74 severe post-stroke aphasia. This was achieved through two objectives, i) documenting the aids and

75 adaptations utilised, and ii) observing how the utilisation of aids and adaptations affects MI fidelity.
76 The study did not explore the impact of MI on mood outcomes.

77

78 Methods

79

80 Ethical approval was granted (August 2012) from National Research Ethics Service: North-West –
81 Preston. The feasibility study was nested within a larger study, performed on an acute stroke unit
82 (ASU). The larger study explored delivering MI in patients with no or mild communication difficulties
83 post-stroke and not those with moderate to severe aphasia. Consecutive people with suspected
84 stroke admitted to the ASU May-December 2013 were screened for eligibility. People were eligible
85 if: aged 18 or over; diagnosis of stroke; medically stable; moderate to severe aphasia based on the
86 Communication Observational Assessment Tool, (COAT) [13], capable of consent; and living within
87 the hospital catchment. Patients were ineligible if they were receiving psychological input (receiving
88 treatment from a psychology professional) or had no verbal expression. Patients with mild
89 communication difficulties were excluded but would have been eligible for the larger study.

90 Formal screening for communication ability was not standard practice on the ASU. To screen for the
91 study, an observational tool was required which was i) non-invasive to the patient, ii) for clinical
92 team use, and iii) able to categorise communication ability through routine observations. The COAT
93 was used (See Appendix 1), based on Speech and Language Therapist (SLT) guidance allowing clinical
94 staff (therapy or nursing) to screen to rate communication using five levels (none/ mild/ moderate/
95 moderately severe/ severe communication difficulties).

96 Purposive sampling was utilised to recruit patients with a range of communication abilities. We
97 aimed to select 6-12 people across the three communication levels (*Severe/ Moderately severe/*
98 *Moderate*), with equal numbers from each. People meeting eligibility criteria were approached by
99 the stroke research nurse or research assistant. Aphasia-friendly study information and consent

100 forms (Appendices 2 and 3) were provided , based on guidance [14,15]. Consent was taken by the
101 stroke research nurse, with written informed consent provided, or witnessed consent for those
102 unable to write.

103 Participant demographic and stroke details were recorded. Baseline measures of functional
104 dependence (Barthel, [16]),communication and mood were completed. Communication was
105 assessed using the Frenchay Aphasia Screening Test (FAST, [17]) and the Comprehensive Aphasia
106 Test (CAT, [18]), the results of which guided the choice of aids and adaptations to tailor
107 communication and MI delivery. Mood was measured using two participant self-report tools, the
108 DISCS [19] and Yale [20] with a score of 2 or more and 1 respectively indicating low mood. Where
109 possible, carer-rated mood measures were administered using the Stroke Aphasic Depression
110 Questionnaire-10 [21] and Signs of Depression Scale [22], with cut-points of 14 and 2 respectively
111 indicating low mood.

112 Intervention design

113 Participants received up to eight sessions of MI, two half-hour sessions per week for four weeks.
114 Session duration and frequency were adapted from the four one-hour sessions in the original trial of
115 MI in stroke [5] to lessen the cognitive demand and fatigue from engaging in MI. Sessions were video
116 and audio-recorded, allowing therapists to later reflect on the session, prepare for the next session,
117 and monitor consistency of technique. MI sessions were delivered by the same therapist, in hospital
118 or at home according to participant choice post-discharge. Post-intervention, participants received
119 usual care.

120 MI therapists

121 Three Therapy Assistants (TAs) from the ASU multi-disciplinary team received training covering:
122 stroke foundations, core research principles, theoretical background to MI and the psychological
123 mechanisms that effect change, and practical MI training, delivered by MI therapists from the
124 original MI post-stroke trial [5], who also provided supervision.. The training lasted one day per week
125 for nine weeks, including independent learning sessions. This was followed by a minimum of ten

126 practice MI sessions with volunteers. Therapists delivered MI with patients with no or mild
127 communication difficulties post-stroke, until confidence and threshold competency were achieved,
128 assessed with the MI Treatment Integrity (MITI) Code [23]. Therapists were provided with an
129 intervention manual, allowing them to monitor their delivery and increase the likelihood that the
130 intervention was delivered as intended.

131

132 Aids and adaptations

133 Aids were physical prompts used to facilitate conversation, whilst adaptations were alterations to
134 the delivery of spoken information. The aids utilised included a communication framework Talking
135 Mats® [24] a simple low-tech method of facilitating communication; a set of cards each with a
136 written word and a corresponding picture. Nine category cards provide a starter topic of
137 conversation (domestic life, relationships, work and education, leisure, learning and thinking, ways
138 of coping, communication, mobility, and self-care). For each category, an accompanying set of cards
139 allows further exploration of each topic. Cards are used (thumbs up, thumbs down, unsure) to
140 indicate response. People may include their own cards (e.g. picture of an activity or relative). The
141 “ways of coping” cards reflecting different emotions, were used to respond to other category cards.
142 Cards are moved around the mat to express thoughts on a topic. While Talking Mats® may not be
143 suitable for all participants; it has previously been used successfully in people with post-stroke
144 aphasia [25], and was a useful resource to initiate conversations. Ahead of MI sessions, a single
145 Talking Mats® training session was provided by the researcher; however tailoring this to patient
146 needs was guided by the SLT.

147 A second aid utilised was the visual rating scale (VRS); a vertical scale where participants rated a
148 response from 0-10. This was used to establish the level of importance or confidence around an
149 issue. Finally, a photo-book was used as a conversation starter, and pen and paper were available for
150 participants or therapists to use as necessary.

151

152 Data analysis

153 Video and audio footage were uploaded and synchronised in NVivo 10. Data were analysed to
154 document the use of aids and adaptations, incorporating verbal and non-verbal information. Video
155 footage was annotated and audio data was transcribed and coded. The MI Skills Code (MISC, Version
156 2.1, [26]) was used instead of the MITI to evaluate therapist MI competence and fidelity (MI
157 consistency), participant behaviours (patient engagement), and the interaction between the two
158 (therapist and patient collaboration), thus offering a more detailed analysis than the MITI as the
159 latter two are not included in the MITI.

160 The MISC was developed to analyse specific therapist behaviours, evaluating therapist adherence to
161 MI principles (fidelity). Two aspects of MI delivery are assessed: Global ratings and individual
162 utterances. Global ratings take a holistic view of MI sessions, establishing more broadly whether
163 there is adherence to the 'spirit' of MI. MISC global ratings reflect MI spirit, empathy, acceptance,
164 egalitarianism, genuineness and warmth. Scores range from 0-7 (higher scores indicating greater
165 adherence) and provide an overview of MI principles demonstrated in each session. Global ratings
166 allow evaluation of i) the therapist's performance, ii) the person's involvement, and iii) the
167 collaboration between therapist and person. This indicates the therapeutic alliance established.

168 Therapist's individual utterances are used to calculate the proportion of MI consistent responses. A
169 second researcher independently coded half of the sessions for global MISC ratings to validate
170 interpretation. To calculate the overall proportion of MI consistent utterances per session, each
171 therapist utterance was coded as MI consistent (MICO) or MI inconsistent (MIIN). Therapist
172 competence is established following MISC guidelines [26] which recommends minimum therapist
173 proficiency levels to achieve 'expert' or 'threshold' scores (for experienced or novice therapists
174 respectively). To reach threshold competency, therapists must achieve over five in global ratings and

175 80% MICO utterances. Expert level should achieve over six for global ratings and 90% MICO
176 utterances .

177

178 Results

179 Between May-December 2013, 201 patients with suspected stroke were screened for eligibility.

180 Eleven were eligible and three consented to participate. A summary of screening and recruitment

181 data is presented in Figure 1.

182 >>>>Insert Figure 1 here<<<<

183 Due to staff attrition, one therapist was the sole provider of MI to the study. The therapist divided

184 her time between her role as MI therapist and therapy assistant supporting SLT and dietetics stroke

185 teams. The therapist had experience of working with people with aphasia utilising aspects of

186 supported conversation, however formal communication training was not provided.

187

188

189 Demographic information and baseline measures

190

191 Demographic information for the three participants is presented in Table 1. At baseline, participants

192 varied in level of aphasia, with participant 1 scoring considerably lower than other participants 2 on

193 all communication measures. Participants differed in functional ability, level of social support

194 (separated/married/widow), and post-stroke role change (working/social/family). No participant

195 screened as having low mood, as seen in Table 2.

196 >>Insert Table 1 here<<

197 Insert Table 2 here

198 Details of the MI intervention received are shown in Table 3. Participants began MI within 2-12
199 weeks post-stroke, attending between 5-7 sessions.

200 Insert Table 3 here

201 Aids and adaptations utilised in MI sessions

202

203 Aids and adaptations used to facilitate communication, incorporating both verbal and non-verbal
204 information were identified. Talking Mats® was particularly useful for enabling open questions and,
205 through moving the appropriate card on to the mat, the participant was able to respond without
206 relying on verbal or written communication alone. Talking Mats® was introduced to all participants,
207 however only the participant with severe aphasia utilised this aid frequently. Talking Mats® cards
208 were supplemented with pictures relevant to the participant in order to illustrate an idea, for
209 example, using a picture of a care home the participant had recently visited.

210 The VRS, although initially intended for use in establishing the participant's level of importance or
211 confidence of an issue was also employed by participants to respond to open questions. For
212 example, to demonstrate how they felt about staying in hospital (low for dislike, higher indicating
213 positivity).

214 Each participants' photo-book showed key aspects of their life, including family, pets, or holidays.

215 The photo-book acted as a conversation starter for participant 1 in particular (severe aphasia),
216 prompting discussion of home life and family. The participant with moderately severe aphasia used
217 an aid of pen and paper, providing her with multiple routes to communicate.

218 SLT guidance included supportive conversation techniques, such as employing a slow pace of
219 conversation, and allowing adequate time for participants' responses. The therapist also used aids to
220 enhance the patient's understanding, including pointing to pictures or words that were being
221 discussed to reinforce the message such as writing key words as they are discussed. Gesture was

222 used by both therapist and participants, providing multiple methods to convey the same
223 information. MI adaptations involved using increased reflections, including reflections of non-verbal
224 information e.g. information conveyed through gesture. Summaries allowed participants to maintain
225 focus on the conversation whilst simultaneously providing an opportunity for the therapist to ensure
226 they had understood the participant. Table 4 highlights the MI strategies used.

227 >>Insert Table 4 here<<

228 The impact of adaptations on MI fidelity

229

230 A second researcher independently coded half of the sessions for global MISC ratings to validate
231 interpretation. Full agreement of ratings or a one-point difference was achieved for 93%. A two-
232 point difference occurred in 7% of ratings, and each was discussed until a consensus was reached.

233 Therapist levels of MI fidelity varied across sessions from sub-threshold to expert level. This variation
234 in MI fidelity was most prominent in sessions delivered with participant 1, who had severe aphasia.

235 A higher level of MI fidelity was applied with participants 2 and 3; with most sessions reaching
236 expert level.

237 The MI ratings are displayed in Table 5. It was expected that the therapist should reach a minimum
238 of threshold level (over five in global ratings / 80% MICO utterances) however for participant 1
239 (severe aphasia), therapist MI ratings varied from below threshold to expert level.

240 Participant 2 (moderately severe aphasia) therapist MISC ratings were good, with all sessions
241 reaching threshold level and many sessions reaching expert level (over six for global ratings / 90%
242 MICO utterances). Participant MISC ratings reached expert level for all sessions except one session
243 which achieved threshold level indicating strong engagement.

244 Participant 3 (moderate aphasia) therapist MISC ratings for participant were also good, with the
245 therapist reaching threshold level in all sessions, and some sessions reaching expert levels. All

246 patient MISC ratings reached expert level, indicating both therapist and participant were positively
247 engaged with a strong therapeutic alliance.

248 >>Insert Table 5 here<<

249 To draw attention to the potential impact of aids and adaptations on the MI content, a summary of
250 sessions with participant 1 (severe aphasia) is shown in Table 6.

251 >>Insert Table 6 here<<

252 Discussion

253 MI has previously been used to prevent depression post-stroke [5]; however, this is the first study to
254 provide support for the feasibility of delivering MI adapted for those with moderate to severe post-
255 stroke aphasia. While involving only a small number of participants, this study has demonstrated
256 that when MI sessions were adapted to meet the needs of those with aphasia, MI principles and
257 fidelity can be achieved. The MI therapist was able to reach threshold levels of MI fidelity, which was
258 demonstrated through both MI consistent utterances and global ratings. Expert levels were achieved
259 in some sessions, as is highlighted in Tables 4 and 5.

260 The therapist was able to maintain high levels of MI fidelity with participants with less severe
261 aphasia (participants 2 and 3), however, struggled to maintain this level across sessions with
262 participant 1 (severe aphasia). This is evident when comparing individual sessions for participant 1
263 (Table 5). Session 3 is the highest rated for MI consistency and spirit. The visual rating scale (VRS)
264 was used 14 times, which may have facilitated 17 open questions. Closed questions were used 49
265 times; however, these are often required for people unable to provide more in-depth verbal
266 responses. Therapist and participant MISC global ratings and overall MI fidelity both reached expert
267 level, and MI inconsistent responses are low (n=3) indicating a successful session. In contrast, session
268 5 has a sub-threshold level of MI. The VRS was used five times, with only 2 open questions

269 facilitated, and 131 closed questions used. Ratings for participant engagement and collaboration are
270 low, with a higher number of MI inconsistent responses (n=17).

271 Aids and adaptations may have facilitated MI techniques, such as open questions and reflections,
272 and consequently the delivery of MI. When aids and adaptations were not used, participants were
273 limited in the information they could communicate. The therapist's ability to tailor sessions for
274 participant 1 (severe aphasia) appeared to impact on MI fidelity as well as participant engagement.

275 However, it may not be that the use of aids and adaptations were responsible for the change in the
276 ability to maintain MI principles. Other factors, including changes in circumstance experienced may
277 have impacted on sessions. The participants experienced varying degrees of life changes post-stroke,
278 including level of physical disability, social support, role change, and consequently had different
279 issues to adjust to. Participant 1, who had multiple significant changes following the stroke, may
280 have been more challenging for the therapist to engage with, than those with fewer or less
281 significant issues to adjust to.

282 Previous MI trials were often limited by their lack of documentation to explain what intervention
283 was delivered [27], reducing validity and replicability. In order to adequately demonstrate treatment
284 fidelity [12, 27, 28] in this study, a range of issues were considered and documented, including:
285 session number, duration and content; therapist background, training and support; MI delivery and
286 adherence to MI principles. The accurate reporting of delivering adapted MI may be particularly
287 important to ensure transparency of what intervention has truly been delivered. Failure to do so,
288 particularly in MI trials, has been highlighted as problematic [29].

289 The small number of participants limited the study, restricting our understanding of the impact of
290 adaptations and a more informative analysis may have been possible with participants with a
291 broader range of communication difficulties. A larger scale study may wish to investigate this

292 further, and may consider using multiple therapists to deliver MI to further our knowledge of the
293 impact of the therapist in this complex relationship.

294 The feasibility study indicates that the delivery of MI to those with post-stroke aphasia has potential
295 for future development. This study has implications for talk-based therapies post-stroke, in
296 particular for those who may struggle to engage in standard talk-based therapies. Adapted MI could
297 offer a form of psychological support that is not currently delivered.

298

299 Conflict of interest

300 None declared

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Table 1. Demographic information and baseline scores of communication, cognition and functional dependence

	Participant 1	Participant 2	Participant 3
Sex	Male	Female	Female
Age	44	65	87
Screening measure			
Level of communication difficulty (COAT)	Severe	Moderately Severe	Moderate
Communication: FAST (max. 30)	1	23	16
CAT expression: Repetition	0/50, 0/74	27/50, 54/74	20/50, 38/74
Naming	0/29, 0/58	16/29, 29/58	13/29, 24/58
Reading	0/35, 0/70	26/35, 56/70	27/35, 54/70
Written Language	0/76	54/76	49/76
CAT Comprehension of written language	10/62	52/62	46/62
Comprehension of spoken language	15/66	52/66	56/66
CAT Cognitive screen	9/38	37/38	30/38
Functional dependence: Barthel (max 20)	4	20	19

*COAT= Communication Observational Assessment Tool, FAST=Frenchay Aphasia Screening Test,

CAT=Comprehensive Aphasia Test,

Table 2. Baseline mood scores

Mood tool	Participant 1	Participant 2	Participant 3
Yale single-item	0	0	0
DISCs (max. 5)	0	1	1
SODS	Not available	1	1
SADQ-10	Not available	8	12

Yale single-item (cut-off 1), DISCs=Depression Intensity Scale Circles (cut-off 2), SODS=Signs Of Depression Scale (cut-off 2)), SADQ-10=Stroke Aphasic Depression Questionnaire-10 (cut-off 14).

Table 3. Details of Motivational Interviewing intervention received

	Participant 1	Participant 2	Participant 3
Number of MI sessions received	5	8	7
Time from stroke to first MI session (weeks)	12	2.5	4
Duration of intervention (weeks)	7	5	5
Length of sessions in minutes Mean (range)	21 (16-30)	23 (18-29)	29 (13-40)

1 Table 4. Session communication strategy and MISC code ratings

Participant	Total no. of sessions	Use of VRS Median (range)	Open questions: Median (range)	Closed questions: Median (range)	Summaries: Median (range)	Reflections: Median (range)	Affirmations: Median (range)	Overall MI consistency** (%) range
1	5	5 (2-14)	8 (2-17)	72 (49-131)	1 (0-7)	19 (10-28)	6 (2-12)	71-95
2	8	1.5 (0-6)	4.5 (3-12)	26 (18-78)	2 (0-7)	21 (10-26)	2 (0-8)	93-100
3	7	1 (0-4)	2.5 (0-8)	21.5 (6-28)	2.5 (1-9)	10 (3-14)	2.5 (0-8)	88-100

2 **MI consistent utterances scored 0-100%, with over 80% reaching threshold level and over 90% for expert level.

3

4 Table 5. Patient MISC and overall MI consistency ratings

Participant	Total no. of sessions	Therapist MI spirit rating*: Median (range)	Patient engagement rating*: Median (range)	Therapist & Patient collaboration rating*: Median (range)	Overall MI consistency** (%) (range)
1	5	4 (4-6)	6 (4-6)	5 (3-5)	71-95
2	8	6 (5-6)	6 (5-6)	5 (5-6)	93-100
3	7	5.5 (5-6)	6 (6-7)	5.5 (5-6)	88-100

5 *Global ratings scored from 0-7, with scores over 5 reaching threshold level and over 6 for expert level

6 **MI consistent utterances scored 0-100%, with over 80% reaching threshold level and over 90% for expert level.

7

8 Table 6. Summary of aids and adaptations used and MI content of sessions with a person with severe aphasia

Sess.	Use of VRS	Open questions	Closed questions	Reflections	Summaries	Therapist MI spirit rating*	Patient engagement rating*	Therapist & patient collaboration rating*	MI inconsistent responses ** %	MI consistent responses ** %	Overall MI consistency ** %
1	3	8	72	19	7	4	5	4	5	38	88
2	7	13	59	18	0	4	6	5	5	44	90
3	14	17	49	25	1	6	6	5	3	52	95
4	2	5	99	10	0	4	6	5	15	37	71
5	5	2	131	28	4	4	4	3	17	44	72

9 Sess.= Sessions, VRS=Visual rating scale. * Global ratings scored from 0-7, with scores over 5 reaching threshold level and over 6 for expert level.**MI consistent utterances
10 scored 0-100%, with over 80% reaching threshold level and over 90% for expert level.

11 Appendix 1. The Communication Observation Assessment Tool

12

13 **Communication Observation Checklist (Please Tick One)**

WS2	Please Tick		Please Tick
<p>Level 1: No Observed Difficulties</p>		<p>Level 2: Mild Communication Problems</p> <ul style="list-style-type: none"> -reduced verbal expression and fluency -speaks in sentences -may have occasional word finding difficulties -able to have a conversation -engages in turn taking 	
<p>WS3</p>			
<p>Level 3: Moderate Aphasia</p> <ul style="list-style-type: none"> -may speak in phrases -may be able to use longer sentences -may have occasional word finding difficulties -sound substitution errors may occur 		<p>Level 4: Moderately Severe Aphasia</p> <ul style="list-style-type: none"> -poor expression using only short phrases or single words 	
<p>Level 5: Severe Aphasia</p> <ul style="list-style-type: none"> -unable to speak in phrases -severe word finding difficulties -reduced expression due to dysarthria only -someone who relies purely on gesture or a communication chart to communicate 			

14 **It should be noted that only categories 3-5 were relevant to the nested feasibility study, and levels 1 and 2*

15 *pertained to the larger scale study.*

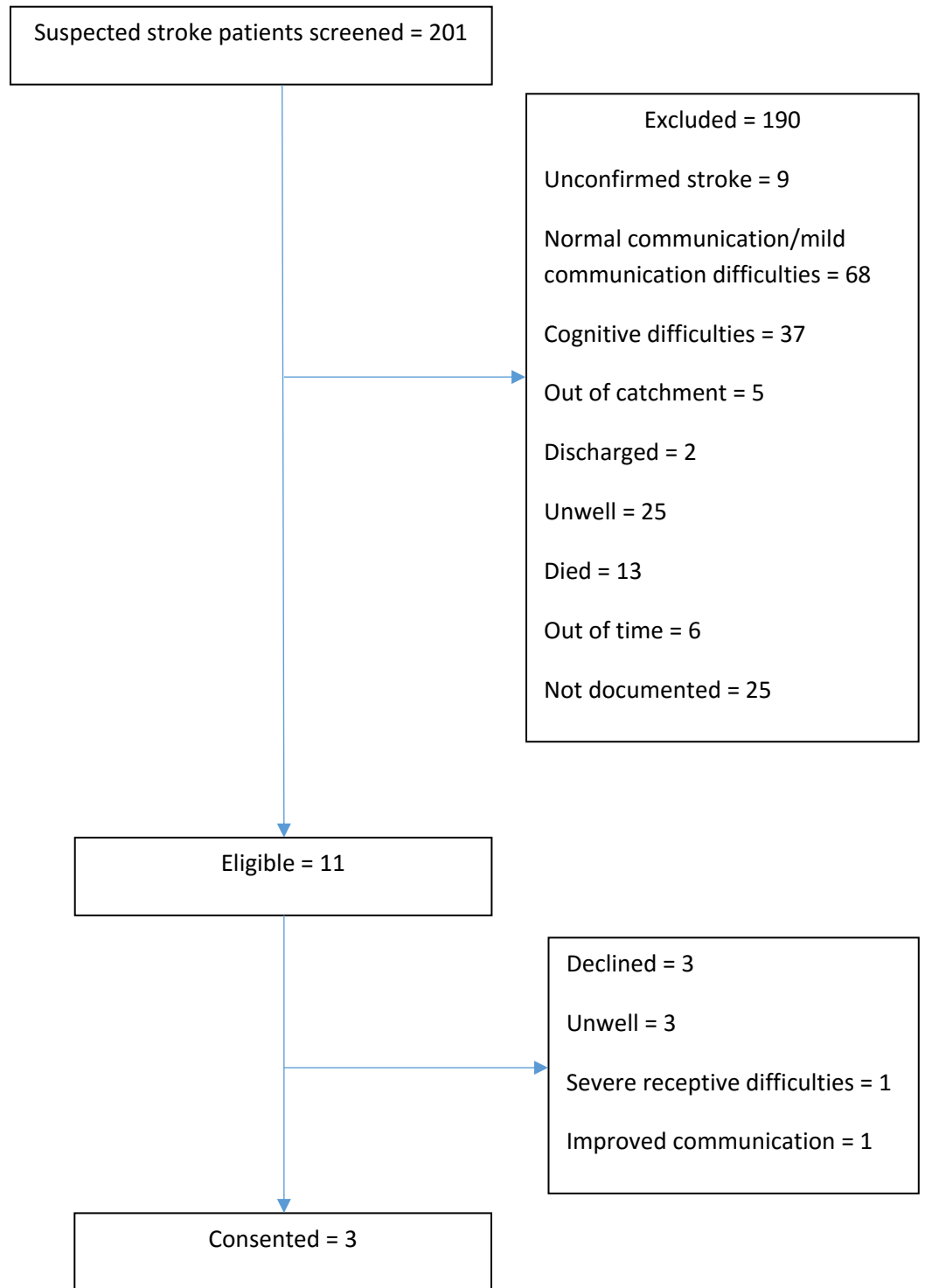


Figure 1: Screening and recruitment to the feasibility study