A Systematic Evaluation of the Adaptation of Depression Diagnostic Methods for Stroke Survivors Who Have Aphasia

Ellen Townend, PhD; Marian Brady, PhD; Kirsty McLaughlan, BSc

Background and Purpose—One in 3 stroke survivors has aphasia (impaired language comprehension and expressive abilities). Conventionally, depression diagnosis uses language-based methods. We aimed to systematically review methods that have been used to diagnose depression and adaptations to these methods intended for people with aphasia.

Methods—We systematically reviewed stroke studies (to January 2006) that included a depression diagnosis and individuals with aphasia. We extracted data related to depression diagnostic methods used for individuals with/without aphasia. We sought clarification from authors when required.

Results—A total of 60 studies included people with aphasia. Almost half the studies (29/60; 48%) adapted their main depression diagnostic method (most typically a clinical interview and published criteria) for individuals with aphasia. Adaptive methods included: using informants (relatives or staff), clinical observation, modifying questions and visual analogue scales. Evidence of the validity or reliability of these adaptations was rarely reported. However, use of informants or clinical observation did achieve the inclusion of most people with aphasia in the diagnosis of depression. Remaining studies, that did not report adaptive methods, suggested that conventional language-based methods are suitable for individuals with only ‘mild’ aphasia.

Conclusions—People with aphasia can be and have been included in depression diagnostic assessments. However, we suggest that depression and language experts collaborate to develop a more valid method of depression diagnosis for patients with aphasia that has good reliability. (Stroke. 2007;38:3076-3083.)

Key Words: aphasia • depression • depression diagnostic methods • systematic review

Aphasia affects ≈20% to 38% of stroke survivors. People with aphasia can have problems with understanding and producing spoken language (eg, conversations), reading, writing and numerical skills. Accordingly, aphasia may negatively influence their personal relationships, employment and social re-engagement. Aphasia is typically associated with left hemisphere damage. Compared with people with right hemisphere damage, individuals with left hemisphere damage may be more likely to retain emotional awareness and demonstrate observable extreme emotional reactions. Therefore, studies of emotion conducted on participants with mainly right hemisphere damage cannot be generalized to individuals with aphasia. The prevalence and associated bio-psycho-social characteristics of aphasia highlight the importance of being able to assess and study depression in this population.

Depression is an important complication poststroke that affects patients’ well-being, recovery and survival. Clinical guidelines recommend routine screening of all patients followed by diagnostic assessment of all those who have been identified as possibly depressed by clinicians with specialist training. A dependence on language-based assessment (eg, questionnaire or verbal interview) to either screen or diagnose depression is clearly going to present barriers for people with aphasia. Much recent research has aimed to develop nonlanguage-based depression screening tools, but has been limited by a failure to actually include patients with aphasia (whose emotional presentation may differ qualitatively from samples of patients with mainly right hemisphere damage). This may be due to the absence of an agreed ‘gold standard’ method for depression diagnosis in aphasia to test screening tools against. It is therefore very important to both clinical practice and research to understand how communication difficulties may be overcome to enable depression diagnosis in aphasia.

We aimed to systematically search, identify, appraise, synthesize and present the methods that have been used to diagnose depression in individuals with aphasia after stroke.
Methods

Criteria for Selecting Studies for This Review

We included studies that diagnosed depression after stroke in individuals with aphasia. We excluded studies published in languages other than English but did not exclude studies on the basis of sample size, study design or recruitment setting. Our definition of ‘depression diagnosis’ was the categorical division of participants into ‘depressed’ and ‘not depressed’, by consideration of prespecified symptoms including low mood. We classified as ‘aphasia’ any description of aphasia, dysphasia, language impairment or related synonyms (such as language comprehension or expressive problems) but not descriptions of cognitive impairment, dementia or decreased consciousness. We classified individuals with aphasia as having participated if this was an explicitly reported inclusion criteria, or if specific results for participants with aphasia were reported. We did not assume that individuals with aphasia had participated based on descriptions of qualified exclusion criteria such as ‘significant’ aphasia.

Search Strategy, Data Extraction and Synthesis

We modified a previously published Cochrane Stroke Group search strategy by using those terms and synonyms relating to ‘stroke’ and ‘depression’ but not ‘clinical trials’. MEDLINE, CINAHL and PsychINFO were searched from inception up to January 2006 and we also scanned reference sections of obtained publications.

Titles and abstracts were screened and rescreened to identify studies that diagnosed depression after stroke. Reviewers (E.T. and K.M.) then independently extracted data to determine the aphasia screening, exclusion and inclusion criteria that had been used. Studies that had both diagnosed depression after stroke and had included people with aphasia were then targeted for closer examination.

We identified whether studies had administered depression diagnostic assessments to all available individuals with aphasia (‘unlimited’) or only to a subgroup of available individuals with aphasia (‘limited’) on the basis of lesser severity or types (as defined by study authors). We took into account whether depression diagnostic assessments had been attempted with all available patients with aphasia during the recruitment stage of studies as well as whether they were finally included in studies.

Details of sample source and size, participant characteristics, time since stroke at first full depression diagnosis, the main depression diagnostic method used and adaptations to this method for aphasia were extracted. Main depression diagnostic methods were identified as were any adaptive methods used for people with aphasia. We noted tools used to assess depressive symptoms (interviews based on published syndromal criteria, interviews based on observer-rating scales, or questionnaires) and diagnostic criteria used (eg, Diagnostic and Statistical Manual of Mental Disorders [DSM]18 or a cut-off point on a scale). Information regarding success or failure in completing both main and adaptive depression diagnostic methods in participants with aphasia was extracted, as were comments and evidence related to the validity and reliability of these methods. We contacted authors to clarify any ambiguities and collated the different types of main depression diagnostic methods and adaptive methods for participants with aphasia using simple content analysis.

Results

Sixty studies, involving a total of 8242 participants (range 18 to 1074), met our inclusion criteria and were reported across 138 publications (for further details, see supplemental Figure I, available online at http://stroke.ahajournals.org). Of the 60 studies, 3 sampled from the community, 24 from acute hospitals and 33 from rehabilitation hospitals or other sources such as outpatient clinics. Time elapsed since stroke ranged from less than a week to 5 years across studies (for details of individual studies see supplemental Table I, available online at http://stroke.ahajournals.org).

Table 1. Published Main Depression Diagnostic Tools (51 studies)

<table>
<thead>
<tr>
<th>Tools (abbreviations)</th>
<th>No. of Studies*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structured clinical interviews</td>
<td></td>
</tr>
<tr>
<td>Structured Clinical Interview for DSMIII or DSMIV (SCID)</td>
<td>7</td>
</tr>
<tr>
<td>Present State Exam (PSE)</td>
<td>7</td>
</tr>
<tr>
<td>Schedules for Clinical Assessment in Neuropsychiatry (SCAN)*</td>
<td>1</td>
</tr>
<tr>
<td>Structured Affective Disorders Schedule (SADS)</td>
<td>2</td>
</tr>
<tr>
<td>Composite International Diagnostic Interview (CIDI)</td>
<td>1</td>
</tr>
<tr>
<td>Structured Assessment of Depression in Brain Damage (SADBD)</td>
<td>1</td>
</tr>
<tr>
<td>Structured interview for Hamilton Depression Rating Scale (SIGH-D)</td>
<td>2</td>
</tr>
<tr>
<td>Observer rated scales</td>
<td></td>
</tr>
<tr>
<td>Hamilton Depression Rating Scale (HDRS)</td>
<td>15</td>
</tr>
<tr>
<td>Montgomery Asberg Depression Rating Scale (MADRS)</td>
<td>7</td>
</tr>
<tr>
<td>Cornell Depression Scale (CDS)</td>
<td>3</td>
</tr>
<tr>
<td>Post Stroke Depression Rating Scale (PSDRS)</td>
<td>1</td>
</tr>
<tr>
<td>Questionnaires</td>
<td></td>
</tr>
<tr>
<td>Beck Depression Inventory (BDI)</td>
<td>3</td>
</tr>
<tr>
<td>Centre Epidemiological Studies Depression Scale (CES-D)</td>
<td>2</td>
</tr>
<tr>
<td>Geriatric Depression Survey (GDS)</td>
<td>4</td>
</tr>
<tr>
<td>Zung Depression Scale (SDS)</td>
<td>4</td>
</tr>
</tbody>
</table>

*Numbers add up to >51 because some studies used >1 depression diagnostic tool.
†The SCAN includes the tenth edition of the PSE.

Characteristics of Participants With Aphasia Included in Depression Diagnostic Assessments

Only 37 of the 60 studies specified the number of participants with aphasia (n=829, range 5 to 60, median proportion =22% with a range of 1% to 100%). Altogether we classified 22 (22/60; 37%) studies as having conducted depression diagnostic assessments in individuals with ‘unlimited’ aphasia and 38 (38/60; 63%) studies as having done so in individuals with ‘limited’ aphasia.

Main Depression Diagnostic Methods

The majority of studies conducted clinical interviews (48/60; 80%) or a clinical interview and questionnaire (6/60; 10%) whereas a minority used only a questionnaire (6/60; 10%). Of those conducting interviews alone, all but 9 used an observer-rating scale or structured interview schedule to structure the interview (see Table 1). Once information on depressive symptoms was obtained, the diagnosis of depression in most studies (43/60; 72%) was based on published syndromal criteria (usually a version of the DSM), whereas other studies used a cut-off point on an observer-rating scale or questionnaire.

The main depression methods used in 3 studies (Cornell Depression Scale, Structured Assessment of Depression in Brain Damage) were specifically chosen for their suitability for participants with aphasia, so these were counted as both main and adaptive methods.
Reporting of Adaptive Depression Diagnostic Methods for Individuals With Aphasia

Overall just less than half of studies (29/60; 48%) indicated having adapted their depression diagnostic method for participants with aphasia. Studies that involved only individuals whose aphasia was ‘limited’ (11/38; 29%) were far less likely to report an adaptive method than studies that involved individuals with ‘unlimited’ aphasia (18/22; 82%).

Types of Adaptive Methods

The adaptive methods reported by the 29 studies included using informants, clinical observation, modifying questions or responses required, modifying the timing of interviews or using visual analogue scales (see Table 2).

Informants to Supplement Interview Findings

The most common adaptation used informants to supplement information obtained from patients (18 studies: 12 with ‘unlimited’ and 6 with ‘limited’ aphasia). Whereas most supplemented information obtained from patient interviews, 2 studies used informants in a more extensive and structured manner.22,23 The SADBD interview schedule22 could become entirely informant-based if a patient was deemed to lack sufficient awareness in all domains of depressive symptoms (physical, cognitive, affective) in a preliminary assessment. In this case the use of informants was sometimes ‘alternative’ rather than ‘supplementary’. Nurses in the Robinson and Szetela study23 completed a structured Nurses Rating Scale for Depression (NRSD) that covered a wide range of depressive symptoms with a focus on nonverbal ones. This formed 1 of 4 assessments that contributed equally to the diagnosis of depression.

Some studies specified whether they used staff (7 studies), relatives/friends (4 studies), or both (3 studies) as the informant(s). The manner of engaging with informants and the nature of the information obtained was rarely described. However, 4 studies specified gauging patient’s mood and motivation from staff reports on day-to-day behavior,24–27 whereas Finklestein et al specified using nurses’ observations to assess nonverbal depressive symptoms (appetite and sleep).28

One study5 stated that using relatives and staff to supplement clinical interviews had been established as a ‘reliable’ method; however, although the supporting references21,28 did use informants they did not report reliability data. Robinson et al20 state that their NRSD had established reliability and validity, but the supporting reference is a duplicate of the same study. In this publication23 they report correlations of the NRSD with the Hamilton Depression Rating Scale (HDRS), Zung depression Scale (SDS) and Polstein’s Visual Analogue Mood Scale (VAMS) of r=0.55, r=0.79 and r=0.60 respectively, but it is unclear how the HDRS itself was completed.

A noncompletion rate of 19 from at least 252 attempts was achieved (based on 12 studies that reported numbers of individuals with aphasia that did not complete5,20,21,23,24,27–29,31–34 and 10 studies that reported the number that did5,20,21,23,24,28,29,31–33)

Clinical Observation

Diagnosticians, most of whom were experienced psychiatrists, used what was described as observations of ‘nonverbal’ behavior (presumably body language, delayed time to respond and other markers of emotion) to infer emotional states in studies with ‘unlimited’ aphasia. In 3 studies, observations of such ‘nonverbal behavior’ was used to provide information to supplement that which had been obtained verbally from interviews. Hermann and colleagues20,21 combined patients and informants reports with his observations using the CDS. Finklestein et al28 combined patients and informants reports assessed with a modified HDRS and 3 ‘experienced observers’ observations and specified that ‘Ratings of aphasic patients (N=8)’ were based heavily on evidence of weeping, anger, agitation, or retardation during the interview.22

In 3 studies, psychiatrist observations were used as an alternative method after noncompletion of interviews with the HDRS. The psychiatrist in Benaim et al’s study36 observed patients generally during their rehabilitation then rated them globally for depressive severity (between 0 to 100) and finally made a categorical judgment as to whether they were depressed. Palomaki et al36 judged whether patients were depressed using the Clinical Global Index that requires the clinician to be an experienced diagnostician (and is generally used to assess improvement after treatment). Andersen et al37 report making clinical observation of whether patients had depression or uncontrollable crying.

Hermann et al21 reported that scores on the CDS were well matched to categorical Research Diagnostic Criteria diagnoses of not depressed, minor depression, probable and definite major depression. However, RDC-based diagnoses appear to have been extracted from the information obtained with the CDS.

All 6 studies using psychiatrist observation reported numbers of individuals with aphasia assessed and only 1 of these36 reported not being able to assess everybody. Overall, a low noncompletion rate of only 4 of 169 individuals was achieved with this method.

Modified Questions, or Responses Required

Four studies (1 with ‘unlimited’ and 3 with ‘limited’ aphasia) reported that interviews were supplemented with...
the use of simple questions designed to require only ‘Yes/No’ or categorical responses,22,26,38,39 Reding et al26 also indicated using participants’ gestures as responses. A noncompletion rate of 14 from at least 46 attempts was achieved (based on 3 studies that reported numbers of individuals with aphasia that did not complete26,38,39 and 2 studies that reported the number that did).38,39

Two studies22,40 (both with ‘limited’ aphasia) reported using response cards as a supplementary method: as part of the interview assessment with the SADBD22; and to aid administration of the SDS questionnaire.40 Neither study reported the number of individuals with aphasia assessed but neither reported any noncompletion.

Four studies (2 with ‘limited’23,41 and 2 with ‘unlimited’ aphasia25,26) reported a supplementary method of verbally administering either the SDS questionnaire23,25,26 or the GDS questionnaire.41 Robinson et al23 report that 10 carers also completed the SDS and that their responses were highly correlated with patients (r = 0.83). A noncompletion rate of 14 from at least 92 attempts was achieved (based on 3 studies that reported numbers of individuals with aphasia that did not complete23,26,41 and 2 studies that reported the number that did).23,41

Modified Timing of Interviews
Two studies (1 with ‘limited’42 and 1 with ‘unlimited’ aphasia43) supplemented interviews by delaying their timing with individuals with more severe aphasia. For example, Morris et al43 suggest that the ‘delay of weeks’ to 2 months poststroke was what accounted for ‘reliable’ communication in all but 5 of their participants, which was evidenced by consistent responses to the GDS questionnaire. Both studies that used delayed interviews reported numbers of individuals with aphasia assessed (n = 100) and neither reported any failure to complete depression diagnosis.

Visual Analogue Mood Scales
Four studies (1 with ‘limited’23 and 3 with ‘unlimited’ aphasia43–45) reported using visual analogue scales. In Robinson and colleagues’ study,23 1 of 4 assessments contributed equally to the diagnosis of depression, but in the other studies visual analogues were used as an alternative method for individuals with aphasia.

Three slightly different visual analogue scales were used. All were based on schematic emotional face pictures joined with a 100-mm line on which respondents were asked to indicate their mood. Robinson et al used an adapted version of Folstein’s horizontal scale46 (with a ‘Frowning’ and ‘Happy’ face as well as the words ‘worst’ and ‘best’ mood at opposite poles). Gainotti et al43 and Paolucci et al44 used Stern and Bachman’s7 vertical scale that joins a ‘Happy’ and ‘Sad’ face. The DESTRO study45 used the ‘Sad’ item from Arruda et al’s48 set of visual analogue scales that is a vertical scale with a ‘Neutral’ and ‘Sad’ face.

Arruda et al’s45 scale is referred to as a ‘validated diagnostic instrument’; however, as the instrument’s authors, they acknowledge their validation study does not generalize to people with aphasia who were excluded. Similarly, Stern and Bachman’s44 scale is stated as ‘valid in aphasic patients’ but people with aphasia were excluded from correlative analyses comparing it to other measures in the supporting references43,47 because they were unable to complete the other measures. Robinson et al23 report administering their visual analogue scale at the start and end of assessment interviews and obtaining a very high test-retest reliability (r = 0.98, P < 0.0001).

A noncompletion rate of 437 of at least 521 attempts was achieved (based on 4 studies that reported numbers of individuals with aphasia that did not complete23,43–45 and 3 studies that reported the number that did complete).23,43,44 Gainotti and colleagues43 discuss why using a visual analogue scale only enabled them to assess 9 of the 23 participants with aphasia (with whom they had been unable to complete the HDRS interview). They highlight that although participants are only required to respond nonverbally, the instructions about how to respond are verbal. They tried using nonverbal gestures as instructions but found participants were also often unable to understand these. As Gainotti et al state, “The majority of severely aphasic patients are unable to understand not only the verbal questions but also the nonverbal requests of the examiner.”43

Confidence Expressed in Adaptive Depression Diagnostic Methods for Aphasia
Three studies that used adaptive methods to enable depression diagnosis in individuals with ‘unlimited’ aphasia expressed lacking confidence in their diagnoses. Andersen and colleagues77 used clinical observation when patients could not complete the HDRS. They expressed doubt that they had been able to distinguish between depression and uncontrolled crying in these individuals and actually decided to then exclude them from their study. Palomaki et al,36 who also used clinical observation when participants could complete neither the HDRS or BDI, excluded these individuals from the analysis. Although Reding et al used adapted depression diagnoses based on informants,25,26 modified questions25,26 and clinical observation26 to include individuals with aphasia, they also expressed uncertainty: “The more neurologically impaired a patient is, the more subjective are our assessments of his mood state.”25 “The clinical diagnosis of depression in the stroke population is difficult.”25

In contrast, I study with ‘unlimited’ aphasia severity13 that delayed interviewing participants with more severe aphasia indicated that aphasia was not generally a hindrance to conventional depression diagnostic interviewing: “Although 49% of the sample had some degree of aphasia following their stroke, only two had receptive aphasia and by the time of evaluation [two months but delayed this ‘by weeks’ if required] most aphasic patients had mild or minimal deficits not severe enough to interfere with the assessment process [Composite International Diagnostic Interview].”13

Completion of Main Depression Diagnostic Methods in Studies That Did Not Report Adaptations
Of studies that did not report an adaptive method, only 4 included individuals with ‘unlimited’ aphasia.29–51 Three of these29–31 reported being unable to complete depression
diagnostic assessments. It is noteworthy that the study by Kotila et al\textsuperscript{51} was the only study with ‘unlimited’ aphasia that had used a questionnaire alone as the main depression diagnostic tool. Therefore, only 1 study\textsuperscript{52} that included individuals with ‘unlimited’ aphasia appeared able to complete a conventional method of diagnosing depression (the HDRS) without the use of adaptations. However, in contrast, they reported using informants to be able to complete a quality-of-life measure.

None of the 27 studies that did not report an adaptive method and had only individuals with ‘limited’ aphasia reported any failures in completing main depression diagnostic methods. However, 4 of these commented that the level of impairment among their participants with aphasia was so mild that completion of their main depression diagnostic method was still possible\textsuperscript{53,54} or that communication was still considered reliable.\textsuperscript{55,56} For example, “None of the patients had aphasia severe enough to disrupt communication.”\textsuperscript{56} “In all aphasic subjects, however, sufficient speech comprehension and production ability to complete a structured clinical interview and the Beck Depression Inventory could be secured.”\textsuperscript{53}

**Discussion**

**Summary of Results**

This review systematically identified 60 studies that diagnosed depression and included at least some individuals with aphasia. Of these, 29 provided information on how conventional language-based methods of depression diagnosis (most typically clinical interviews) were adapted in aphasia. The most common adaptive method was to use informants, whereas others used observation of nonverbal behavior in clinical interviews, simplified questions or a visual analogue scale.

Both the use of informants and clinical observation achieved very high combined completion rates, despite most studies using them for individuals with ‘unlimited’ aphasia. Studies that reported modifying interview questions (to only require ‘Yes/No’ responses, or with cue cards) or questionnaires (with verbal administration) also achieved good completion rates. However, all but 1 only included individuals with ‘limited’ aphasia, so it is unclear how successful they would be for individuals with more severe language-impairments. One small study\textsuperscript{23} used a visual analogue scale successfully with all their participants with ‘limited’ aphasia; however, the combined completion rate for 3 studies\textsuperscript{33–35} that used a visual analogue scale with individuals with ‘unlimited’ aphasia was very poor.

Nearly all studies used a standardized, structured tool and published criteria or cut-off points to diagnose depression in participants without aphasia. However, adaptive depression diagnostic methods for individuals with aphasia tended to lack structure and be so briefly described that exact replication would not be possible. Also, evidence of the validity or reliability of these adaptive methods was generally not reported or not substantiated by an independent study.

A few researchers, who did not report an adaptive depression diagnostic method, suggested that their participants’ aphasia was too mild to affect communication.\textsuperscript{53–56} Logically, this seems to be a contradiction in terms. However, 27 studies, that were restricted to people with ‘limited’ aphasia, neither reported having adapted their depression diagnostic method, nor reported failing to complete assessments. Therefore, the idea that some people with aphasia can communicate well enough to undergo a language-based depression diagnostic interview appeared to be a common one.

**Strengths and Limitations**

We thoroughly reviewed the adaptation of depression diagnostic methods for people with aphasia. Authors were contacted for clarification about ambiguous reporting, but others may have also used adaptive depression diagnostic techniques for aphasia but simply failed to report their use. Completion rates for the different adaptive methods we have calculated should only be taken as rough guides because only a minority of studies provided this information.

We found studies that assessed all available individuals with aphasia regardless of severity or type (‘unlimited’) to be more likely to report adaptive depression diagnostic methods and to report difficulty completing assessments in aphasia than studies that only included a subgroup of available individuals with aphasia (‘limited’). We acknowledge that gross descriptions of aphasia severity (‘limited’, ‘unlimited’) fail to communicate the complexity of retained communicative skills across comprehension, expression and the verbal and written modalities. Ideally, we would have been able to compare studies by participants’ aphasia severity level and type less crudely. However, this was not possible because there is no internationally agreed standard for defining aphasia severity and because many studies failed to even report how aphasia itself was assessed.\textsuperscript{57}

**Commentary and Critique of Adaptive Methods Used**

**Informants to Supplement Interview Findings**

Despite high completion rates achieved using informants, certain reservations should be noted. Firstly, only 2 studies provided a structured, replicable format for informant use and these present different problems. The SADBD used by Gordon et al\textsuperscript{22} is a very extensive assessment containing over 70 questions. Their study actually included only a tiny fraction of people available with aphasia. Informants may struggle to estimate the detailed symptoms involved in the SADBD for individuals with more marked communication impairment. Whereas Robinson et al\textsuperscript{23} report no difficulties with their NRSD, Sinyor and colleagues\textsuperscript{40} report having to omit questions about verbal communication which their nurses could not rate and no significant association between the NRSD and the SDS. Similarly, House et al\textsuperscript{58} report that nurses in their study often failed to complete a similar screening tool. An interesting explanation may be that nurses in Robinson et al’s study were more confident at observing behavior in aphasia because they worked within a specialist aphasia institute.

The use of informants to estimate subjective cognitive symptoms of depression (eg, worthlessness) is of doubtful face-validity. A recent quality-of-life after stroke study found...
that carers’ proxy responses for patient mood significantly differed from patients and were affected by their own perception of carer burden.59 However, informants’ estimation of somatic symptoms of depression (eg, insomnia) appears much more reasonable. The Structured Aphasia Depression Questionnaire, which uses informant ratings of somatic symptoms and nonverbal behavior to screen for depression, may provide a useful measure of these symptoms to partially aid the diagnosis of depression in aphasia (although it remains to be tested in a study that has diagnosed depression in aphasia).60

Clinical Observation
Studies that used this method all achieved high completion rates. However, authors of studies were divided by whether they were confident in their diagnoses, or whether they disregarded them as too subjective or too influenced by emotionalism. An interesting explanation may be that the more confident diagnosticians were more experienced in working with patients with aphasia and may have ‘intuitively’ developed a greater range of communication skills and proficiency for enabling their communication.

Modified Questions or Responses Required
The use of simplified questions, supplementary key written phrases or verbal rather than written material are recommended techniques for maximizing communication with people with aphasia.61,62 However, other techniques such as repetition and use of pictorial material are also recommended and the techniques used should be tailored to an individuals needs. As the studies reviewed here only tested such techniques in people with ‘limited’ aphasia, they do not support their isolated use as sufficient to fully adapt depression diagnostic methods for all individuals with aphasia.

Delaying Timing of Interviews
Prevalence rates for aphasia do decrease in the months after stroke, with most spontaneous recovery taking place in the first month.1,2,5 However, like other poststroke impairments, aphasia does become a chronic condition in many cases.5 Therefore, delayed timing of depression diagnostic assessment is only likely to increase completion rates for some patients with aphasia, and this may not always be a clinically appropriate strategy.

Visual Analogue Scales
The visual analogue scales used in reviewed studies do not claim to provide sufficient assessment for the diagnosis of depression.46–48 Only 1 symptom of depression (low mood) is addressed, and although the scales provide a nonverbal response format they provide only verbal instructions. Gainotti and colleagues43 discussed having attempted to provide alternative nonverbal instructions but with a low success rate. The concept of expressing one’s mood metaphorically as a point on a line between highly stylized face pictures is very abstract. House and colleagues,58 who tested the performance of Folstein’s visual analogue scale as a screening tool, report finding participants ‘bewildered’ by it and to be more likely to respond to a depression questionnaire.

Of course, Robinson and colleagues23,30 did not report problems with Folstein’s scale and achieved a high test-retest result (that suggested participants’ responses at different times differed by only minimal amounts on the 100-mm line). However, this was a very small study (n=1823 or n=2530) and this visual analogue scale that uses a horizontal not a vertical line is unsuitable for individuals with hemianopia. On balance, the visual analogue scales reviewed provide neither a suitably comprehensive nor a particularly successful method of diagnosing depression in aphasia. Elsewhere, the suitability of visual analogue scales with stroke patients has been more generally criticized.63 However, the use of realistic looking pictures (with which people with stroke may more easily identify) may usefully support communication about mood with people with aphasia.62,64

Implications and Recommendations
The ability to diagnose depression in people with aphasia is essential to clinical practice. It is also important to further investigations into emotional disorder in this population and the development of depression screening measures. We would recommend future research to describe aphasia exclusion and inclusion criteria,57 whether and how depression diagnostic methods are adapted for individuals with aphasia along with completion and failure numbers. This would allow readers to judge the use of methods for people with different severity levels or types of aphasia and enable replication.

Future research to assess the reliability and validity of adaptive methods for diagnosing depression in aphasia is clearly required. Of course, the validity of a diagnostic gold standard can only be estimated through consensus expert opinion. We would recommend depression experts consider involvement and collaboration with language experts, such as speech and language therapists (whose absence within reviewed studies was apparent). This would allow research to develop adaptive methods that are accurately matched to individual’s specific aphasic profiles—to maximize retained skills, avoid severely impaired language components or modalities, or provide maximum support for these deficits. Ideally, because certain symptoms of depression are largely subjective (notably low mood, anhedonia, worthlessness and suicidal ideation), depression diagnosis in aphasia should involve patient self-report as it does for patients without aphasia.

Speech and language therapists are skilled in using a set of techniques for supporting communication in aphasia, including: observation of gestures (as questions and responses) with written key phrases and pictures (both preprepared and created with pen and paper during a conversation) along with simplified verbal communication (eg, Yes/No questions) that can be tailored to suit the person with aphasia’s individual needs and language abilities.61,62 Although aspects of these techniques were described in reviewed studies, we would recommend that formal training and use of supportive communication in combination with depression diagnostic interviewing skills could be developed into a semistructured clinical interview schedule for use with patients with aphasia.

Conclusions
Individuals with aphasia can and have been included in studies that have diagnosed depression using a range of
adaptive, minimally language-dependent methods. However, the validity and reliability of these methods has not been established. Only a few studies reported using ≥1 adaptive technique and none described the depression diagnostician having been trained in, or using, the full range of skills that are available to support communication in people with aphasia. We would suggest that depression and language experts collaborate to develop and test communication training and materials to support the comprehensive assessment of depressive symptoms in people with aphasia, particularly more severe aphasia.

Acknowledgment

We thank Sarah Hinks for contributing to the screening of articles.

Source of Funding

This study was partially funded by Chest Heart and Stroke Scotland (CHSS).

Disclosures

None.

References


Supplemental References


References


---

6260 titles/abstracts screened

5858 excluded

- 965 Publications duplicated across databases
- 4234 Not stroke patients or depression
- 313 Reviews, comments or letters without original data
- 258 Depression not operationalised as a diagnosis
- 77 Stroke sub-types in which aphasia absent or rare
- 11 Not available from The British Library

402 publications screened

176 excluded

- 4 Not stroke patients
- 25 Reviews, comments or letters
- 44 Depression not operationalised as a diagnosis
- 40 Retrospective depression/diagnosis
- 38 Translation not available
- 25 Sample duplicates multiple partial other samples

129 studies (226 publications) examined for the ex/inclusion of individuals with aphasia

69 studies (88 publications) excluded as did not include individuals with aphasia

60 studies (138 publications) that included individuals with aphasia

---

1 Studied only patients with: right hemisphere damage, subarachnoid haemorrhagic stroke, or other highly specific stroke-types in which aphasia is rarely associated; or case studies of patients without aphasia
Table I. Study Details, Aphasia Severity Range, Main and Adaptive Methods of Diagnosing Depression Used and Information on Their Completion

<table>
<thead>
<tr>
<th>Study ID</th>
<th>n</th>
<th>Time (since stroke)</th>
<th>Aphasia Severity Range</th>
<th>Main Depression Diagnostic Method: Interview or Questionnaire (tool*: criteria†/cut-off)</th>
<th>Was Adaptation to Depression Diagnostic Method Indicated? If so Summarize</th>
<th>Failure Complete Depression Diagnosis in Aphasia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aben et al.84</td>
<td>202</td>
<td>1 mo</td>
<td>Limited</td>
<td>Interview (SCID: DSMIV)</td>
<td>Y Clinical observation (judged whether appeared depressed or to have severe uncontrolled crying) However, excluded those unable complete main method from study</td>
<td>Main method not completed in 36</td>
</tr>
<tr>
<td>Andersen87,88-72</td>
<td>209</td>
<td>1 mo</td>
<td>Unlimited</td>
<td>Interview (HDRS: cut-off ≥13)</td>
<td>Y Clinical observation (Psychiatrist observed behaviour and decided if depressed or not)</td>
<td>Not completed in 4</td>
</tr>
<tr>
<td>Aben55,65–67</td>
<td>202</td>
<td>&lt;1 wk</td>
<td>Limited</td>
<td>Interview (SCID: DSMIV)</td>
<td>Y Informants (friends, relatives and staff)</td>
<td>Main method not completed in 25 but adaptive method was</td>
</tr>
<tr>
<td>Benaim35</td>
<td>50</td>
<td>Admission rehabilitation</td>
<td>Unlimited</td>
<td>Interview (HDRS: cut-off &gt;7)</td>
<td>Y Clinical observation (Psychiatrist observed behaviour and decided if depressed or not)</td>
<td>Main method not completed in 4 of 23 with aphasia</td>
</tr>
<tr>
<td>Carlsson77</td>
<td>63</td>
<td>1 y</td>
<td>Limited</td>
<td>Interview (clinician: DSMIII)</td>
<td>Y Informants (nurses reports of last weeks behaviour)</td>
<td>Adaptive method not completed in 320 with aphasia or other communicative impairment</td>
</tr>
<tr>
<td>Carod-Artal76‡</td>
<td>90</td>
<td>1 y</td>
<td>Unlimited</td>
<td>Interview (HDRS: cut-off not reported)</td>
<td>Y Informants (did not specify who)</td>
<td></td>
</tr>
<tr>
<td>Cassidy74-78</td>
<td>50</td>
<td>3–12 mo</td>
<td>Limited</td>
<td>Interview (SIGH-D: DSMIV)</td>
<td>Y Informants (nurses reports of last weeks behaviour)</td>
<td></td>
</tr>
<tr>
<td>Choi-Kwon54</td>
<td>220</td>
<td>&lt;3 mo</td>
<td>Limited</td>
<td>Questionnaire (GDS: &gt;10)</td>
<td>Y Visual analogue scale as alternative method to interview (Psychiatrist observed behaviour and decided if depressed or not)</td>
<td></td>
</tr>
<tr>
<td>Creed49</td>
<td>44</td>
<td>2 wk poststroke unit</td>
<td>Unlimited</td>
<td>Interview (clinician: DSMIV)</td>
<td>Y Visual analogue scale as alternative method to interview</td>
<td></td>
</tr>
<tr>
<td>Dam78-82</td>
<td>92</td>
<td>Approx 1 mo</td>
<td>Limited</td>
<td>Interview (HDRS: RDC)</td>
<td>Y Informants (did not specify who)</td>
<td></td>
</tr>
<tr>
<td>Desmond83</td>
<td>421</td>
<td>3 mo</td>
<td>Limited</td>
<td>Interview (SIGH-D: cut-off &gt;11)</td>
<td>Y Informants (did not specify who)</td>
<td></td>
</tr>
<tr>
<td>DESTRO45</td>
<td>1074</td>
<td>2–6 wk</td>
<td>Unlimited</td>
<td>Interview (MADRS: DSMIV)</td>
<td>Y Visual analogue scale as alternative method to interview (Psychiatrist observed behaviour and decided if depressed or not)</td>
<td></td>
</tr>
<tr>
<td>Eastwood84</td>
<td>87</td>
<td>Approx 3 mo</td>
<td>Limited</td>
<td>Interview (SADS: DSMIII)</td>
<td>Y Informants (nurses reports of appetite and sleep)</td>
<td>Main method not completed in 23 with aphasia</td>
</tr>
<tr>
<td>Finklestein28</td>
<td>25</td>
<td>Approx 1 wk-4 mo</td>
<td>Unlimited</td>
<td>Interview (modified HDRS: cut-off ≥3 out of 4)</td>
<td>Y Informants (nurses reports of appetite and sleep)</td>
<td></td>
</tr>
<tr>
<td>Gainotti43,45-48</td>
<td>153</td>
<td>2 wk-6 mo</td>
<td>Unlimited</td>
<td>Interview (HDRS PSDRs: DSMIII)</td>
<td>Y Visual analogue scale as alternative method to interview</td>
<td>Main method not completed in 14 of these 23</td>
</tr>
<tr>
<td>Giaquanto89</td>
<td>259</td>
<td>&lt;1 mo</td>
<td>Limited</td>
<td>Questionnaire (BDI: ICD-10)</td>
<td>Y SADBD includes: Informants Assess awareness and if found unaware clinician ratings used instead Simplified questions (to require only Yes/No or categorical responses) Cards with key phrases (used to prompt or aid responses)</td>
<td></td>
</tr>
<tr>
<td>Gonzalez-Torreillas50</td>
<td>130</td>
<td>&lt;4 wk</td>
<td>Limited</td>
<td>Interview (SADS: RDC)</td>
<td>Y SADBD includes: Informants Assess awareness and if found unaware clinician ratings used instead Simplified questions (to require only Yes/No or categorical responses) Cards with key phrases (used to prompt or aid responses)</td>
<td></td>
</tr>
<tr>
<td>Gordon22</td>
<td>116</td>
<td>2 mo</td>
<td>Limited</td>
<td>Interview (SADBD: DSMIII)</td>
<td>Y SADBD includes: Informants Assess awareness and if found unaware clinician ratings used instead Simplified questions (to require only Yes/No or categorical responses) Cards with key phrases (used to prompt or aid responses)</td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
<table>
<thead>
<tr>
<th>Study ID</th>
<th>n</th>
<th>Time (since stroke)</th>
<th>Aphasia Severity Range</th>
<th>Main Depression Diagnostic Method: Interview or Questionnaire</th>
<th>Was Adaptation to Depression Diagnostic Method Indicated?</th>
<th>Failure Complete Depression Diagnosis in Aphasia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herrmann8</td>
<td>150</td>
<td>3 mo</td>
<td>Limited</td>
<td>(MADRS: cut-off ≥20)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Herrmann20</td>
<td>47</td>
<td>&lt;2 mo</td>
<td>Unlimited</td>
<td>(SCID CDS MADRS: DSMIIIR)</td>
<td>Y</td>
<td>If could not do SCID used CDS alone that uses: Informants (does not specify who) Clinical observation non-verbal behaviour</td>
</tr>
<tr>
<td>Herrmann21</td>
<td>42</td>
<td>&lt;6 mo</td>
<td>Unlimited</td>
<td>(CDS: RDC)</td>
<td>Y</td>
<td>CDS includes: Informants (does not specify who) Clinical observation non-verbal behaviour</td>
</tr>
<tr>
<td>Hoeking11</td>
<td>79</td>
<td>3 mo</td>
<td>Limited Questionnaire</td>
<td>(GDS: cut-off &gt;9)</td>
<td>Y</td>
<td>Verbal administration questionnaire (for GDS)</td>
</tr>
<tr>
<td>Kauhanen5,91–93</td>
<td>101</td>
<td>&lt;1 wk</td>
<td>Unlimited Interview</td>
<td>(clinician: DSMIIIR)</td>
<td>Y</td>
<td>Informants (family and staff)</td>
</tr>
<tr>
<td>Kellerman84</td>
<td>82</td>
<td>1 wk</td>
<td>Limited Interview</td>
<td>(clinician: DSMIV)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Kim23,95</td>
<td>148</td>
<td>2–4 mo</td>
<td>Limited interview</td>
<td>(clinician: DSMIV)</td>
<td>Y</td>
<td>Informants (close relatives)</td>
</tr>
<tr>
<td>King34</td>
<td>53</td>
<td>discharge rehabilitation</td>
<td>Limited Questionnaire</td>
<td>(CES-D: cut-off ≥15)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Kotila51</td>
<td>154</td>
<td>3 mo</td>
<td>Unlimited Questionnaire</td>
<td>(BDI: cut-off not reported)</td>
<td>N</td>
<td>'some patients could be examined only partially'</td>
</tr>
<tr>
<td>LEASS42,87–99</td>
<td>246</td>
<td>3 mo</td>
<td>Limited Interview</td>
<td>(HDRS: DSMIV or cut-off ≥8)</td>
<td>Y</td>
<td>Delayed questioning (waited until ‘after recovery’ to assess depressed mood in 4 patients with Global or Wernicke’s aphasia)</td>
</tr>
<tr>
<td>Lipsey100–102</td>
<td>65</td>
<td>Approx 6 mo</td>
<td>Limited Interview</td>
<td>(PSE: DSMII)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Lofgren103</td>
<td>47</td>
<td>3 y</td>
<td>Limited Interview</td>
<td>(MADRS: DSMIV)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Malec104*</td>
<td>20</td>
<td>&lt;4 wk</td>
<td>Limited Interview</td>
<td>(HDRS: RDC)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Morris33,105–111</td>
<td>99</td>
<td>2 mo</td>
<td>Unlimited Interview</td>
<td>(CID: DSMIII)</td>
<td>Y</td>
<td>Delayed questioning (reduced unreliable responses due severe aphasia by ‘delay of weeks’) Informants (relatives or close friends) at 1–2 year follow-up</td>
</tr>
<tr>
<td>Nannetti112</td>
<td>117</td>
<td>&lt;1 mo</td>
<td>Limited Both</td>
<td>(clinician: DSMIV or GDS CDS: cut-offs not reported)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Neau113</td>
<td>65</td>
<td>&lt;2 d</td>
<td>Unlimited Interview</td>
<td>(MADRS: DSMIIIR)</td>
<td>Y</td>
<td>Informants (usually partners)</td>
</tr>
<tr>
<td>OCSP-150,114,115,58</td>
<td>128</td>
<td>1 mo</td>
<td>Unlimited Interview</td>
<td>(PSE: DSMIII)</td>
<td>N</td>
<td>Main method not completed in 6 of 19 with aphasia</td>
</tr>
<tr>
<td>OCSP-229,116</td>
<td>60</td>
<td>3–5 y</td>
<td>Unlimited Interview</td>
<td>(SCID: DSMIIIR)</td>
<td>Y</td>
<td>Informants (usually relatives)</td>
</tr>
<tr>
<td>Örebo Stroke Study117‡</td>
<td>253</td>
<td>1 y</td>
<td>Unlimited Interview</td>
<td>(clinician: DSMIV)</td>
<td>Y</td>
<td>Informants (relatives and nurses)</td>
</tr>
<tr>
<td>Palomaki36,118</td>
<td>100</td>
<td>&lt;1 mo</td>
<td>Unlimited Both</td>
<td>(HDRS BDI: DSMIIIR)</td>
<td>Y</td>
<td>Clinical observation (CGI: Clinical Global Index) However, excluded those unable complete main method from analysis</td>
</tr>
</tbody>
</table>

(Continued)
Table I. Continued

<table>
<thead>
<tr>
<th>Study ID</th>
<th>n</th>
<th>Time (since stroke)</th>
<th>Aphasia Severity Range</th>
<th>Main Depression Diagnostic Method: Interview or Questionnaire (tool*: criteria†/cut-off)</th>
<th>Was Adaptation to Depression Diagnostic Method Indicated? If so Summarize</th>
<th>Failure Complete Depression Diagnosis in Aphasia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paolucci44,119</td>
<td>470</td>
<td>Approx 1–2 mo</td>
<td>Unlimited</td>
<td>Interview (HDRS: cut-off ≥18)</td>
<td>Y Visual analogue scale as alternative method to interview Excluded those unable complete adaptive method from study</td>
<td>Adaptive method not completed in 103 with aphasia or other communicative impairment</td>
</tr>
<tr>
<td>Pohjasvaara56,120–124</td>
<td>277</td>
<td>3 mo</td>
<td>Limited</td>
<td>Interview (SCAN for DSMIIIR ICD-10)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Rao125,126§</td>
<td>25</td>
<td>6 mo-1 y</td>
<td>Limited</td>
<td>Both (HDRS GDS for DSMIV)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Reding25</td>
<td>27</td>
<td>6 mo-1 y</td>
<td>Unlimited</td>
<td>Both (HDRS, SDS for DSMIII)</td>
<td>Y Informants (staff observations day-to-day self care, transfer and ambulation) Verbal administration questionnaire (for ZDS)</td>
<td></td>
</tr>
<tr>
<td>Reding26</td>
<td>75</td>
<td>Approx 7 wk</td>
<td>Unlimited</td>
<td>Both (HDRS SDS for DSMIII)</td>
<td>Y Informants (staff observations day-to-day self care, transfer and ambulation) Simplified questions (to require only Yes/No or gestured responses) Verbal administration questionnaire (for ZDS)</td>
<td></td>
</tr>
<tr>
<td>Reding27‡‡</td>
<td>44</td>
<td>1 mo</td>
<td>Unlimited</td>
<td>Interview (clinician for DSMIIIR)</td>
<td>Y Informants (nurses day-to-day observation vegetative symptoms, frustration and tearfulness)</td>
<td></td>
</tr>
<tr>
<td>Robinson23,30</td>
<td>18</td>
<td>&lt;15 y</td>
<td>Limited</td>
<td>Both and other modes (HDRS SDS visual analogue scale NRSD, depressed if high scores on 3 of 4 measures)</td>
<td>Y Informants (nurses observations day-to-day self care, transfer and ambulation) Non-verbal behaviour using NRSD Visual analogue scale (VADS with non-verbal requests) Verbal administration questionnaire (for ZDS)</td>
<td></td>
</tr>
<tr>
<td>Robinson127</td>
<td>103</td>
<td>6 mo-2 y</td>
<td>Limited</td>
<td>Interview (PSE for DSMIII)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Robinson128–130</td>
<td>104</td>
<td>Approx 1–2 mo</td>
<td>Limited</td>
<td>Interview (PSE for DSMIV)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Robinson131–143</td>
<td>103</td>
<td>Approx 1–2 wk</td>
<td>Limited</td>
<td>Interview (clinician for DSMIII)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Robinson144</td>
<td>28</td>
<td>1 y</td>
<td>Limited</td>
<td>Interview (PSE for DSMIII)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Schramke146§</td>
<td>44</td>
<td>&gt;1 y</td>
<td>Limited</td>
<td>Interview (SCID for DSMIIIR)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Schwartz146</td>
<td>91</td>
<td>Approx 2 mo</td>
<td>Limited</td>
<td>Interview (HDRS, cut-off ≥18)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Sinyor40,147</td>
<td>64</td>
<td>Approx 2 mo</td>
<td>Limited</td>
<td>Interview (SDS, cut-off f=50)</td>
<td>Y Cards with key phrases (used to allow those with expressive aphasia to point responses)</td>
<td></td>
</tr>
<tr>
<td>Spalletta7,148–151‡</td>
<td>329</td>
<td>&lt;1 y</td>
<td>Limited</td>
<td>Interview (SCID for DSMIV)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Starkstein38,152–153‡</td>
<td>205</td>
<td>&lt;2 wk</td>
<td>Limited</td>
<td>Interview (PSE for DSMIII)</td>
<td>Y Simplified questions (to require only Yes/No responses)</td>
<td></td>
</tr>
<tr>
<td>Starkstein38,156–160‡</td>
<td>80</td>
<td>1 wk</td>
<td>Limited</td>
<td>Interview (PSE for DSMIII)</td>
<td>Y Simplified questions (to require only Yes/No responses)</td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
Table I. Continued

<table>
<thead>
<tr>
<th>Study ID</th>
<th>n</th>
<th>Time (since stroke)</th>
<th>Aphasia Severity Range</th>
<th>Main Depression Diagnostic Method: Interview or Questionnaire (tool*: criteria†/cut-off)</th>
<th>Was Adaptation to Depression Diagnostic Method Indicated?</th>
<th>If so Summarize</th>
<th>Failure Complete Depression Diagnosis in Aphasia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suh¹⁶¹</td>
<td>225</td>
<td>Approx 1 y</td>
<td>Limited</td>
<td>Questionnaire (CES-D, cut-off ≥16)</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verdelho³⁴</td>
<td>142</td>
<td>6 mo</td>
<td>Unlimited</td>
<td>Interview (MADRS, cut-off ≥7)</td>
<td>Y Informants (did not specify who)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wiart¹⁶²</td>
<td>31</td>
<td>Approx 1–2 mo</td>
<td>Limited</td>
<td>Interview (MADRS, cut-off ≥19)</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Williams¹⁶³</td>
<td>316</td>
<td>1–2 mo</td>
<td>Limited</td>
<td>Interview (SCID for DSMIV)</td>
<td>N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*See Table 1 for full titles of published main depression diagnostic tools. The NRSD (Nurse Rating Scale for Depression) is not published but available from the study authors.²³,³⁰
†DSM indicates Diagnostic and Statistical Manual of the American Psychiatric Association; various versions were used, eg DSMIV or 4th Edition; ICD-10, International Classification of Diseases, 10th Revision; RDC, Research Diagnostic Criteria (earlier version of DSMIII).
‡Based on unpublished information from study authors as well as published information.
§Studies that did not restrict recruitment by aphasia severity or type but were nevertheless classified as studies with ‘limited’ aphasia because they reported that by chance no participant presented with a severe level or type of aphasia.
A Systematic Evaluation of the Adaptation of Depression Diagnostic Methods for Stroke Survivors Who Have Aphasia
Ellen Townend, Marian Brady and Kirsty McLaughlan

Stroke. published online October 11, 2007;
Stroke is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2007 American Heart Association, Inc. All rights reserved.
Print ISSN: 0039-2499. Online ISSN: 1524-4628

The online version of this article, along with updated information and services, is located on the
World Wide Web at:
http://stroke.ahajournals.org/content/early/2007/10/11/STROKEAHA.107.484238.citation

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Stroke can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Stroke is online at:
http://stroke.ahajournals.org//subscriptions/