Systematic review of subjective memory measures for stroke and aphasia

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Background: Cognitive Issues in Stroke and Aphasia

- Stroke affects multiple of cognitive processes (e.g., Barker Collo et al., 2010; Jokinen et al., 2015; Rasquin et al., 2013; Turunen et al., 2016)
  - Perception
  - Attention
  - Memory
  - Executive function

- Deficits in each cognitive domain possible in aphasia (e.g., DeDe et al., 2014; Edmonds et al., 2014; Dignam et al., 2017; Murray, 2012, 2017)
  - Impairments evident on cognitive tasks with high as well as nominal language demands
  - Cognitive deficits may underlie or exacerbate aphasic language symptoms
  - Potent relationship between cognitive deficits and aphasia recovery and treatment outcomes
Background: Memory Issues in Stroke and Aphasia

- Memory difficulties are a frequent (30%–40%) consequence of stroke in adults, irrespective of stroke type and severity (das Nair et al., 2016; Snaphaan & de Leeuw, 2007; Tang et al., 2018)
  - Any or several memory skills may be compromised
    - Long-term, short-term, and/or working memory
    - Declarative and/or nondeclarative/procedural memory
    - Verbal and/or nonverbal memory
- Memory difficulties and aphasia co-occur (Dignam et al., 2017; Mayer & Murray, 2012; Sideropoulos et al., 2015)
- Concerns of stroke survivors about long-term consequences of memory difficulties in relation to dementia onset (Pendlebury & Rothwell, 2009)
- Memory capacity is vital for learning and rehabilitation (Sulleman & Kim, 2015; Tuomiranta et al., 2014)
- Memory deficits interfere with social re-integration post-stroke (Balasooriya-Smeeken et al., 2017)

Background: The evidence about needs

- What do stroke survivors *themselves* think about their memory?

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<tr>
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<th>Perceived Problem</th>
<th>Unmet Need</th>
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<tbody>
<tr>
<td>UK (N = 799)</td>
<td>43%</td>
<td>59%</td>
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<tr>
<td>Australia (N = 734)</td>
<td>68%</td>
<td>45%</td>
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Memory measures

Objective
driven by a person’s performance in tasks that engage particular memory processes (e.g., digit span, story recall)

Subjective
driven by a person’s perceptions of performance in real life activities (e.g., recalling names in conversation, reading, shopping)

Background: Defining Subjective Memory Measures

• A measure designed to elicit information (usually only quantitatively) about a person’s (or carer’s) self-perception of his/her memory abilities that uses examples of activities of daily living involving memory or related constructs

• The memory abilities may be of any type of (e.g., episodic, short-term, prospective). Related constructs may include aspects of attention or other examples that involve cognitive functions considered to majorly involve aspects of memory (e.g., executive function)

• In measures eliciting information about other aspects of a person’s health or well-being (e.g., mobility, quality of life), the majority of items must include memory or related constructs
Example

**Patient Competency Rating** *(Prigatano et al., 1986)*

How much of a problem do I have in:

- staying involved in work activities even when bored or tired?
- remembering what I had for dinner last night?
- remembering names of people I see often?
- remembering my daily schedule?
- remembering important things I must do?

1. Can't do
2. Very difficult to do
3. Can do with some difficulty
4. Fairly easy to do
5. Can do with ease

Example

**Everyday Memory Questionnaire** *(Sunderland et al., 1983)*

**Faces and Places section**

- Forgetting where you have put something. Losing things around the house.
- Failing to recognise friends or relatives by sight.
- Failing to recognise television characters or other famous people by sight.
- Getting lost or turning in the wrong direction on a journey or walk you have often been on.
- Failing to recognise places you are told you’ve often been to before.
- Finding television stories difficult to follow.

Interview with patient and/or spouse

“In the last week, how often ...”

(rating scale 1 - 5 = always - never)
Motivation for Present Study

- Limited knowledge how memory impairments affect stroke survivors’ levels of participation (cf., ICF model; e.g., Kagan et al., 2008)
- Issues with objective memory measures (Dubreil et al., 2007):
  - Ecological validity
  - Role in goal setting in rehabilitation
- Limited knowledge about insight and self-efficacy (Dixon et al., 2007)
- Extent of use of subjective memory measures in stroke and stroke aphasia as outcome measures for memory interventions (including STM/WM)
- Recent evidence to suggest SLPs’ knowledge and use of subjective measures of memory or other cognitive domains is limited (Salis, Murray, & Bakas, 2018; Wallace et al., 2016)

Specific Aims

1. To identify the range of subjective memory measures used in the stroke and stroke-related aphasia literature
2. To investigate the extent to which subjective memory measures provide an accurate reflection of memory impairments in stroke and stroke-related aphasia (i.e., comparison of participants’ ratings to norms from age-matched, neurotypical participants)
3. To document representation of individuals with aphasia in this stroke literature domain
4. To examine the extent to which subjective memory measures correlate with objective memory measures in stroke and stroke-related aphasia
Search Strategy

Sources:
- Embase
- Medline
- PsychINFO
- Scopus
- Web of Science
- Hand searches

Search terms
(comprehensive range) about:
- Subjective memory, functional/every day memory
- Stroke, cerebrovascular accident, aphasia, dysphasia

Time span:
1970 – September 2017

Inclusion criteria

1. Adults (>18) who had suffered a clinical stroke who may or may not present with aphasia (at any stage of recovery), any type of stroke (ischaemic, haemorrhagic) in any part of the brain (e.g., L/R hemisphere, sub-cortex)

2. Use of functional memory measure (as defined earlier)

3. In mixed aetiologies (e.g. trauma, dementia, tumour) the majority of participants should be stroke survivors (given quantitatively, with data on relevant data supplied for stroke subgroup on functional memory measure)

4. Papers with duplications of relevant datasets were NOT INCLUDED
Exclusion Criteria

- Studies about participants with silent stroke, TIA, microinfarcts, small vessel disease or studies that use related terminology which DO NOT include a clearly identified sample with clinical stroke
- Studies about participants with progressive vascular (e.g., CADASIL, vascular dementia, mixed dementia) or non-vascular aetiologies that may or may not affect cognition
- Studies that did not include subjective memory instruments (as previously defined)
- Qualitative studies about memory and cognitive abilities that did not include a subjective memory instrument

Records screened on titles or abstracts = 6,426
Records excluded:
- = 3,726 on title
- = 1,757 on abstract
- = 68 additional duplicates removed

Full-text articles assessed for eligibility = 875
Full-text articles excluded = 837

Articles included in quantitative and qualitative synthesis (n = 38)

Observational studies = 26
Treatment studies = 12
Participants Across the 38 Included Studies

Total N = 2,725 participants

Observational studies
n = 2,313

Treatment studies
n = 412

Range of Subjective Memory Measures

• 25 different measures used:
  • 4 different versions of the Cognitive Failures Questionnaire
    (original version by Broadbent et al., 1982)
  • 3 different version of the Patient Competency Rating Scale
    (original version by Prigatano & Fordyce, 1986)
  • 3 different versions of the Everyday Memory Questionnaire
    (original version by Sunderland et al., 1983)
Accurate Reflection of Functional Memory Abilities

- 24 of the 38 studies did not report comparisons with neurotypical participants, that is 52% of participants were not compared to “norms”

- Across the studies with statistical comparisons there were discrepant findings:
  - Duffin et al. (2012) reported no significant differences between stroke and control participants
  - Lamb et al. (2013) found below-norm ratings for 56% of their stroke sample
  - Man et al. (2015) only the older stroke group differed from controls; younger stroke group did not (n = 29)

Aim 3

Representation of stroke-related aphasia

- Representations of persons with aphasia is overall unclear:
  - Limited or lack of information about aphasia in the included studies
    - Unclear if and how many participants had aphasia (e.g., Barker-Collo et al., 2010)
    - How aphasia was identified was not described (e.g., Duffin et al., 2012)
  - In several studies, “severe aphasia”, exclusionary criterion but number of participants with aphasia of lesser severity not quantified (e.g., Aben et al., 2008; Davis et al., 1995)
  - Only 1 study (Ronnberg et al. 1996) specified number of participants with aphasia, and described how presence and severity of aphasia were determined
Aim 4

Relation between subjective-objective measures

- Only 8 (of 38 studies) included statistical comparisons between subjective and objective measures
  - Diversity in objective measures when included, making across-study comparisons difficult

- Some moderate correlations with the Rivermead Behavioural Memory Test (e.g., Davis et al., 1995)

- When demographic factors were controlled, however, only a correlation with an auditory-verbal learning test remained significant (cf., Aben et al., 2009)

Summary

1. Diversity of subjective memory measures (even when seemingly “same/similar”) confounds resolving outcome differences across studies

2. Given serious limitations in the lack of normative data, subjective memory measures (as currently reported in the included studies) cannot be said to provide an accurate reflection of participation limitations in the stroke literature

3. Very limited understanding how functional memory is affected in stroke-related aphasia

4. Because of the relative absence of objective memory tests in the included studies and the diversity of such measures used when included, it is not possible to ascertain the nature or strength of relationship between subjective and objective memory measures in stroke and stroke-related aphasia
Implications for Aphasia Research/Management

- Inclusion of subjective memory measures in (STM/WM) treatments (Vallat-Azouvi et al., 2014; Zakarias et al., 2018)

- Communication/QoL in aphasia measures (e.g., CETI, SAQOL-39) vs. subjective memory measures:
  - sensitivity in detecting change
  - relevance to persons (and carers)
  - relevance to researchers

- Subjective memory measures are heavily language-based; adaptations would be necessary (cf., Menger et al., 2017)

Select References


