Neuropsychological Assessment in Memory Services

Guidance from the London Dementia Clinical Network

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Introduction

The 2019 London Memory Service Audit[1] highlighted wide variation in the use of diagnostic neuropsychology assessments in patients undergoing assessment for dementia by memory assessment services. Overall, 7 per cent of patients were referred for diagnostic neuropsychological assessment varying from 0 to 22 per cent per service. This suggests under provision in some services and possible over-referral in others.

The updated NICE clinical guideline on dementia[2], published in June 2018, states:

Consider neuropsychological testing if it is unclear:

- whether the person has cognitive impairment **or**
- whether their cognitive impairment is caused by dementia **or**
- what the correct subtype diagnosis is

The aim of this document is to support good clinical assessment and diagnosis and to reduce the variation in neuropsychology practice between memory services. It does this by setting out guidelines on when it is appropriate to administer a neuropsychological assessment, what a good quality assessment looks like and how the results should be reported and communicated. These results can be used to inform psychosocial interventions and cognitive rehabilitation. It is also intended to promote a consistent approach to its use in the assessment of people with suspected dementia.

What is a neuropsychological assessment?

Neuropsychological assessment is an objective, performance based method of assessing brain functioning. A neuropsychological assessment involves the administration of standardised tests (with normative data) across a range of cognitive domains which typically include memory, language, visuospatial and perceptual functions, attention and executive functions.

Why is it important in community Memory Services?

Neuropsychological assessment plays an important role in the identification and characterisation of cognitive changes needed for an accurate diagnosis of dementia or mild cognitive impairment (MCI).

The diagnosis of dementia (and MCI) requires evidence of an objective decline in cognition. It is essential to distinguish normal, age-related changes in cognition from the presence of a possible neurodegenerative process.

Whilst cognitive screening tests are efficient and useful tools in identifying cognitive impairment, they can have limited utility for differential diagnosis[3].

Evidence-based reviews, however, have shown that neuropsychological assessment can successfully differentiate between specific dementia subtypes, as well as delineating dementia from normal ageing, MCI or mental health conditions, such as depression[4,5].

Neuropsychological assessment and formulation can help in the following ways:

- To inform diagnosis and treatment planning.
- To better understand a person's cognitive strengths and weaknesses in the context of their life and relationships.
- To identify how cognitive changes may affect a person's functioning in everyday life.
- To inform the development of cognitive strategies to support the person and those around them to manage these changes.

Who may benefit from neuropsychological assessment?

Neuropsychological assessment is recommended for those whom cognitive screening tests have yielded inconclusive results. This may be more likely for the following groups:

- People presenting with specific cognitive difficulties (e.g. memory, changes in language, visuospatial or executive functions) and cognitive screening measures may not be sensitive enough to capture these.
- People for whom there is a discrepancy between their performance on cognitive screening tests and subjective reports of their cognition and functional ability.
- People with very high life-long intellectual ability for whom screening tests may not be sensitive enough to detect a decline in cognitive functions.
- People who require a more tailored cognitive assessment (e.g. those from non-English speaking backgrounds, or those with modest levels of pre-morbid functioning etc.).
- People experiencing additional psychological distress (e.g. depression, anxiety, recently bereaved etc.).
- People with severe and enduring mental health conditions (e.g. schizophrenia or bipolar disorder).

A multidisciplinary team discussion can help to clarify whether a neuropsychological assessment is definitely required.

When is neuropsychological assessment not recommended?

- Those for whom a diagnosis of dementia can already be made based on the clinical history, behavioural observations and results of investigations, such as cognitive screening tests and neuroimaging.

- Those for whom an organic cognitive decline can be excluded on the basis of clinical assessment e.g. functional cognitive disorder or cognitive symptoms that are clearly due to a mental health disorder such as depression.
- Those who already have an established diagnosis of dementia (i.e. where the purpose is for 'monitoring' disease progression).

When to complete a neuropsychological assessment?

A comprehensive, hypothesis-driven neuropsychological assessment should be offered when the results from brief cognitive screening tools are inconclusive. The decision as to when to complete a neuropsychological assessment should be informed by consideration of the findings from the initial interview, cognitive screening tools and neuroimaging[3].

The psychologist should use clinical judgement as to the appropriate timing of a neuropsychological assessment. For example, assessment should be delayed for the following people:

- Those who are, or have recently been, acutely unwell with infection (including urinary tract infection) or delirium.
- Those who have experienced a recent neurological event (e.g. stroke, head injury etc.).
- Those who have experienced a recent significant life event, e.g. bereavement, house move etc), or change in psychotropic medication.
- A delay should also be considered for those are regularly using substances or consuming alcohol to excess, following advice to reduce or limit use if possible and signposting to appropriate services.

What does a good neuropsychological assessment look like?

Planning the neuropsychological assessment

- Comprehensive neuropsychological assessment of a person with suspected dementia should involve an appropriately trained psychologist with expertise in the neuropsychology of dementia[6].
- The referral question should be clarified with the referrer; this enables a hypothesis-driven approach to neuropsychological assessment in order to best answer the referral question.
- Assessments should be person-centred and guided by information gained from the referrer, brief cognitive screens and clinical interview.
- Assessment should be adapted in order to enhance the individuals' engagement in the process (e.g. timing, length of session or number of sessions).

Pre-diagnostic Counselling

- The principles of pre-diagnostic counselling should be considered to maximise informed consent and engagement. This should include a discussion about the reason for the referral, what the assessment will involve, potential outcomes of the assessment (including a possible diagnosis of dementia) and subsequent implications (i.e. for driving, insurance etc.), whilst instilling a realistic sense of hope[3,7].
- The psychologist should elicit the person's preference for how the diagnosis should be disclosed, whilst also respecting the rights of those who do not wish to know[3,8].
- The pre-diagnostic counselling and clinical interview should be conducted in accordance with the context of the service; for example, if the neuropsychologist is part of a multidisciplinary team and sees the person following the initial assessment with another clinician, then it will be a matter of checking and clarifying the understanding of previous discussions.

Clinical Interview

- The clinical interview is a key part of the neuropsychological assessment, providing essential information to guide the assessment process and formulations[9].
- The clinical interview should be culturally sensitive, collecting as much information as possible to contextualize the neuropsychological data and inform formulation.
- Information from the clinical interview should be considered alongside neuropsychological data to improve the validity of the assessment.
- A high quality clinical interview should consider the following:
    - The person's subjective concerns
    - Impact on functioning (including any environmental risks)
    - Views of the wider system (i.e. collateral information from family, friends or carers)
    - Relevant personal information (e.g. handedness, educational and occupational background)
    - Physical and mental health history
    - Current coping strategies
    - The person's strengths and abilities

Test Selection and Administration

- Unnecessarily lengthy assessments should be avoided. It is therefore advisable to start with briefer neuropsychological tests and then progress to more in-depth assessment if indicated[3].
- Neuropsychological tests should be selected on the basis of the referral question and potential differential diagnoses.

- Psychometric properties should also be considered in the selection of neuropsychological tests (e.g. validity, reliability, quality of normative data etc.).
- A comprehensive neuropsychological test battery will include measures of:
    - Premorbid ability (i.e. an estimate of life-long intellectual ability)
    - Memory
    - Language
    - Visuospatial and perceptual functions
    - Attention and processing speed
    - Executive functions
    - Emotional well-being
    - Performance validity if appropriate[21]
- Flexibility in test selection can be helpful given each person will have differing needs, and the test battery should be adapted accordingly (e.g. considering the person's level of ability; language and cultural differences; sensory impairments; physical disability etc.).
- Whilst not intended to be an exhaustive list, some commonly used neuropsychological tests for assessing a person with suspected dementia are outlined in Appendix 1.

Assessment with people from non-English speaking backgrounds

- A majority of neuropsychological tests have been developed for use with Western or English-speaking populations. As a result, test batteries, and their administration, should be adapted for patients from non-English speaking backgrounds[10,11].
- The following can help to optimize the reliability and validity of assessments with people from non-English speaking backgrounds:
    - The person should be offered a professional interpreter who speaks the same dialect.
    - Meet with the interpreter 30 minutes beforehand to explain the assessment process and translate test items and instructions as necessary.
    - Consider potential sociocultural norms throughout the assessment (including beliefs about memory, dementia, mental health, roles and responsibilities).
    - It is recommended that, where possible, tests are used that have been validated and normed with people from the same cultural background as the person with suspected dementia. It is acknowledged, however, that this is not always possible in clinical practice owing to limited access to tests with appropriate norms.
    - Avoid the use of tests in a standard battery that rely strongly on language skill or those which contain culture specific information.

- At the end of the assessment, ask the interpreter for any qualitative observations of the person (e.g. any observed difficulties with expressive or receptive communication).
- Apply caution when interpreting assessment results; avoid over-interpreting poor performance which may be related to language or cultural differences.
- Comment qualitatively on performance on tests that have been translated, or where normative data is not applicable.

How should results be reported?

Neuropsychological assessments are complex and the results can be difficult for both the referred person and healthcare professionals to understand. The key principle in report writing, therefore, is that the information is presented in a way which is most useful for the intended reader. The report should be clear and concise and should include information relevant to the referral question[12]. Below is a suggested structure to writing neuropsychological assessment reports:

Background Information

- The reason for the referral
- The date(s) of the assessment and who conducted it
- Where the assessment was conducted (e.g. at home or clinic)
- Method of assessment (e.g. face to face or remote)

Clinical Interview and Behavioural Observations

- What was the person's view of their difficulties?
- What was the wider system's view of the person's difficulties?
- What strengths did the person and their wider system report?
- Brief summary of relevant personal information
- What were your observations of the person (e.g. interpersonal behaviour, appearance, affect, motivation etc.)?

Test Results

- This section should aim to be concise with only the most salient information described[13]:
    - The names of the tests that were administered (and what cognitive domains that these tested).
    - The scaled scores and/or percentiles of the test results.
    - The ranges that the scores relate to (e.g. '*average'*, '*borderline*').

Conclusions and Recommendations

- What are the person's areas of strength and relative weaknesses?
- Are the results indicative of an organic cognitive impairment?

- Are there any confounding factors present? If so, state the possible impact of these on the results.
- What useful, specific recommendations can be made for the person, their wider system and plan of care? (examples of interventions below)
- Would a repeat assessment be useful?

Communicating the assessment results

Timely, accurate and sensitive feedback from neuropsychological assessment is an intervention in itself. It is best practice to offer the person an opportunity to discuss the results with them directly, and answer any questions they may have about the assessment. It can be helpful to structure the feedback session in terms of relative areas of strength and relative areas of weakness and relating these findings to the person's own subjective experience[14].

If the results of the neuropsychological assessment lead to a diagnosis of dementia being made, specific guidance is available regarding how best to communicate this[15,7].

Using the results to inform interventions

The results of neuropsychological assessment profiles and subsequent recommendations can be used to inform psychosocial interventions for people living with cognitive impairment.

Cognitive rehabilitation, for example, may be an appropriate, evidence-based intervention for the person following a diagnosis[16,17]. Within this context, clinicians can tailor their interventions by drawing on the person's identified strengths to support areas of weakness, whilst also employing and developing compensatory strategies (e.g. the use of Mnemonics and external aids).

It should be noted that this work is not always conducted by psychologists; occupational therapists, for example, have devised a specific 'home-based memory rehabilitation programme' for people with dementia[18].

Repeat assessments

If an initial neuropsychological assessment does not lead to a diagnosis of dementia, it can provide a useful baseline for any future assessment to investigate reliable change in cognition over time[19].

Some memory services do not automatically follow-up those who were not diagnosed with dementia following initial assessment, and these people (including those with MCI) are discharged back to the care of their GP. In these

cases, the person should be provided with clear information on how to access a re-referral or re-assessment in future.

For services who routinely offer reviews (e.g. for those with MCI), or when a person is re-referred, it is useful to consider whether it is necessary for the full neuropsychological assessment to be repeated in order to make a diagnosis.

Where re-assessment is recommended, an interval of approximately 12 months is advised in order to account for the effects of repeated testing, which may otherwise mask cognitive decline[19,20]. With this in mind, consideration should be given to test-retest practice effects and the concept of 'reliable change' when interpreting results from repeat assessments[19].

Electronic storage of response form

The electronic storage of completed response forms is not advised due to issues relating to copyright and intellectual property law. The British Psychological Society states that *'…in many situations, the legally preferable and most practical solution will be to treat test forms in the same manner as process notes (Section 4.3), whereby the raw data and other relevant information such a notes made on the form are transcribed into the electronic health record (in an interpretative report or table of data), and the original form is destroyed'*[22].

Summary

- Neuropsychological assessment is a useful tool to support the early and accurate diagnosis of dementia, particularly for those with inconclusive results from brief screening tests.

- Clinicians should use clinical judgement, based on data from clinical history, initial cognitive screens and neuroimaging, to determine when a neuropsychological assessment is offered.

- The psychologist should consider the referral question to inform a hypothesis-driven approach to assessment.

- The test battery should be adapted to fit the needs of the referred person, and in a way which optimises reliability and validity of the data.

- Neuropsychological assessment reports should be clear and concise, and written in a way that is useful for the intended reader.

- It is good practice to feed back the results from the assessment to the person, and consider useful, specific recommendations alongside this to inform care planning.

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Appendix 1: Examples of commonly used neuropsychological tests / batteries within memory services

Domain	Standard	Higher Functioning	Non-English Speaking Background
Premorbid optimal ability	TOPF / WTAR / NART / Spot the Word	TOPF / WTAR / NART / Spot the Word	Educational and occupational background Best subtest score e.g. WAIS-IV Picture Completion
Intellectual Functions		WAIS-IV Vocabulary WAIS-IV Similarities WAIS-IV Block Design WAIS-IV Matrix Reasoning	Raven's Advanced Progressive Matrices / Raven's Coloured Progressive Matrices
Memory	RBANS List Learning RBANS Story Recall RBANS Figure Recall	BMIPB II / WMS-IV Logical Memory (& recognition) WMS-IV Visual Reproduction (& recognition) CVLT-III (Short Form)	KBNA List Learning *(translated)* WMS-IV Visual Reproduction KBNA Picture Recognition
Language	RBANS Picture Naming RBANS Fluency	Graded Naming Test / Boston Naming Test	KBNA Picture Naming / Oldfield Naming Test *(qualitative only)*
Visuospatial and perceptual functions	RBANS Figure Copy RBANS Line Orientation	VOSP Position Discrimination VOSP Incomplete Letters Rey Figure	VOSP Position Discrimination VOSP Incomplete Letters *(if letters are known)* WAIS-IV Block Design
Attention and Processing Speed	RBANS Orientation RBANS Digit Span RBANS Coding	WAIS-IV Digit Span WAIS-IV Coding	KBNA Orientation WAIS-IV Digit Span *(if numbers are known)* WAIS-IV Coding *(if numbers are known)* Colour-Trails Part 1 *(if numbers are known)*
Executive Functions	DKEFS Verbal Fluency DKEFS Colour-Word Test DKEFS Trail Making	DKEFS Verbal Fluency DKEFS Colour-Word Test DKEFS Trail Making Hayling Sentence Completion Test	Colour-Trails Part 2 *(if numbers are known)* Modified WCST or Weigl Brixton Spatial Anticipation Test DKEFS Category Fluency and Category Switching
Emotional well-being	PHQ-9 & GAD-7 / HADS	PHQ-9 & GAD-7 / HADS	DISCS / Visual Scale