Improving the Quality of Neuropsychological Assessment Practice: The Development of a Self-Assessment Audit Tool

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Abstract

Objective: Strict competency frameworks exist for training in, and provision of, clinical neuropsychological assessment practice. However, as in all disciplines, daily clinical practice may drift from the gold standard practice without routine monitoring and audit. A simple-to-use, but thorough and evidence-based audit tool has been developed to facilitate the tracking, maintenance, and discussion of best practice over time.
Method: A literature search and liaison with experienced neuropsychology colleagues did not unearth any pre-existing audit standards. Therefore, 39 new standards were generated, which were guided by best practice literature and clinical neuropsychology colleague discussions, to form the proposed self-assessment audit tool. Due to the diverse nature of services, both core and supplementary standards are proposed to enable the audit to be tailored to suit individual services' needs.
Results: During its development, the tool has so far been trialed in two U.K. National Health Service clinical services in different localities, on three occasions, with a total patient population of $N = 78$ in order to refine the standards and to generate practice recommendations.
Conclusions: This audit tool is presented for services to self-assess their neuropsychological assessment practice. The authors plan to take this work forward with the British Psychological Society's Division of Neuropsychology as a policy document for self-assessment and peer review. Other potential developments include contributing to clinical neuropsychology training tools and refining audit standards for use more widely, such as in pediatric services, or internationally with diverse populations.

Keywords: Assessment; Professional issues; Executive functions; Malingering/symptom validity testing; Learning and memory

Introduction

The specialist skill of clinical neuropsychological assessment requires a systematic and accurate approach to behavioral observation, objective testing, and interpretation of findings (Board of Directors American Academy of Clinical Neuropsychology (AACN), 2007). High quality assessments are vital to ensure that clinical neuropsychologists can accurately describe patterns of deficit; offer helpful, targeted advice; assist with diagnosis; offer effective therapy and rehabilitative input with patients, their families, and carers; and contribute effectively to multi-disciplinary neurorehabilitation and meaningful clinical decision-making.

Imprecise language, inadequate interpretation of different forms of evidence, and sparsely elaborated conclusions may lead to miscommunication, patient distress, and ineffective clinical decision-making (Wanlass, 2012). It is not sufficient to simply "*describe scores and provide no further interpretation and/or recommendations*" (Schoenberg & Scott, 2011, p. 6). Test scores must be considered in the context of wider biopsychosocial factors that may affect, and in turn be affected by, the patterns of observed performance; with an eye on potential shortcomings of the testing instruments and environmental effects. The neuropsychological report and verbal feedback session are important vehicles for communicating such complex information. Meta-analyses have posited neuropsychological assessment feedback as a clinically meaningful therapeutic intervention but have not focused on specific elements of the assessment process itself (Poston & Hanson, 2010; Watt & Crowe, 2018).

The authors found few papers looking at the quality of neuropsychological assessments, and those identified largely elicited service user feedback to assess this (Griffin & Christie, 2008; Mountjoy, Field, Stapleton, & Kemp, 2017). These studies highlight some particular strengths of neuropsychological assessments from the viewpoint of the service user. Namely, reporting the assessment process itself to be interesting and helpful and commenting that the provision of verbal feedback facilitates depth of understanding and management of neuropsychological symptoms. Potential areas of poor quality patient experience were also highlighted, such as feeling fatigued and frustrated as a result of testing; that written reports were unhelpful or difficult to understand; that the testing process itself had been unnecessary to resolve the presenting referral problem; and a "wearing off" of understanding and reassurance effects over time.

These findings highlight the importance of eliciting service user feedback to improve service delivery and evaluate the quality of neuropsychological practice., However as patient feedback is only one measure of neuropsychological assessment quality, there is the additional need for assessment of more technical and professional aspects of which service users would generally not be aware. Further, neuropsychological assessments have different audiences (patients, family members, referrers, medico-legal teams, etc.), all of whom may have different priorities surrounding the assessment. Thus, it is important to consider multiple perspectives, including but not limited to patient experience, when assessing the quality of neuropsychological assessments.

Postal and colleagues (2017) surveyed neuropsychologists and referral sources, finding that shorter, clearer, more personalized reports with quicker turnaround times and patient-specific recommendations were most valued by referrers. However, there was some reluctance among neuropsychologists to change their existing report format (often favoring a report style which was more detailed and lengthy but therefore slower to complete).

Further, Ireland (2012) analyzed 126 medico-legal psychology reports submitted to the family courts, raising some areas of poor assessment practice, including: not answering the instructed question, using out-of-date or inappropriate psychometrics relative to the opinion formed based on them, and mismatches between observed data and opinion. Four raters deemed over two thirds of the assessed reports to be "poor" or "very poor" in overall quality, and although some methodological issues about the Ireland report have been raised, the findings do highlight disparities in the quality of psychological assessment practice across practitioners.

Large employers of clinical neuropsychologists (e.g., the National Health Service [NHS] in the United Kingdom and the U.S. Department of Veterans Affairs in the USA) often require their employees to complete regular audit and peer review of their work. National professional bodies also uphold standards of governance and professional conduct in order to maintain certification of their membership. This role is held in the USA by the American Board of Clinical Neuropsychology and the AACN, and in the United Kingdom, it is held by both the Division of Neuropsychology (DoN), within the British Psychological Society (BPS), and the Health and Care Professions Council. Although often requiring minimum hours of continuing professional development (CPD), or continuing education credits (CEC), these bodies do not require regular self-assessment, or uphold specific quality standards surrounding the minutiae of everyday neuropsychological assessment practice.

While all neuropsychological assessments do not have to be uniform and will certainly differ according to the setting, reason for referral, patient characteristics, and individual clinician style, the authors propose a set of minimum quality standards both to encourage neuropsychologists to reflect on the quality of their own work and to ensure confidence in neuropsychological assessment practice across settings and clinicians. The proposed standards will ensure that neuropsychological assessments follow consistent procedures to: gather sufficient information to describe neuropsychological function holistically; account for extraneous variables that may affect test scores; optimize patient information, consent, and satisfaction; maximize report clarity and impact; and appropriately document clinicians' work.

In order to advance this aim, the authors have developed and propose a self-assessment clinical audit tool for use in assessing how clinical neuropsychology assessments measure up in comparison to practice ideals. As far as we are aware, this is the first published study to do so.

Clinical audit is necessary to ensure high standards of care through adherence to principles of best practice. The ability to design and carry out audits is included within the competency framework for U.K. clinical neuropsychologists published by the BPS, DoN (2012). Clinical audit comprises systematic evaluation against evidence-based standards to check the quality of processes and facilitate continuous improvement (Healthcare Quality Improvement Partnership (HQIP), 2011; National Institute
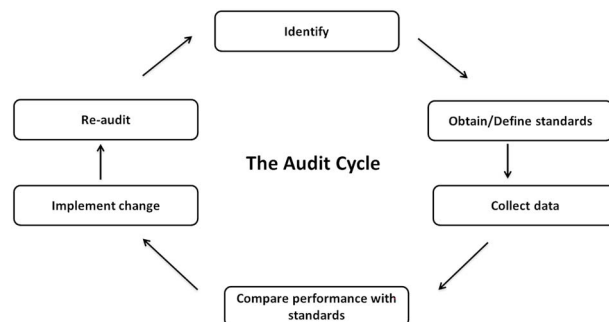
Fig. 1. The clinical audit cycle.

for Clinical Excellence (NICE), 2002). In the case of neuropsychological assessment practice, no operationalized standards to benchmark against currently exist; hence, we are presenting this tool in which we have generated auditable standards.

Clinical audit is a cyclical, iterative process (see Fig. 1) in which an issue or problem requiring improvement is identified, goals are set, and current performance is assessed against those goals in terms of measurable (yes/no) standards. Required changes in order to improve performance against audit standards are then identified, and plans are put in place to implement them. The effects of changes made are assessed via re-audit after a pre-defined period of time. Targets for change may include refined standards reflecting service/context changes, or continued improvement; that is, if 90% compliance of a standard was met, the target might be increased to a standard of 95% compliance at the next audit to drive further improvement (although HQIP recommends that targets should be set to achieve 100% compliance with standards at all times, HQIP, 2012).

To commence audit tool development, the lead author proposed an audit of neuropsychological assessment practice within a large clinical neuropsychology service in the north west of United Kingdom. This service provides neuropsychological assessment (along with therapeutic input) across inpatient, outpatient, and community settings and within various specialty services, including epilepsy surgery, awake craniotomy, subarachnoid hemorrhage, deep brain stimulation, and traumatic brain injury. Assessments within this service are requested for reasons, including identification of cognitive strengths and weaknesses, aiding diagnoses, contributing to assessments of mental capacity, assessing suitability for (or the outcome of) neurosurgery, and long-term rehabilitation planning. Assistant psychologists (trained to U.K. Bachelor's degree level) often administer testing under the supervision of clinical psychologists (trained to doctoral level in clinical and research skills) and qualified clinical neuropsychologists (trained in the United Kingdom to doctoral level in clinical and research skills, with subsequent further post-graduate level training and supervised practice in neuropsychology).

While a number of helpful guidelines about good quality report writing are available, their focus is often too narrow, that is, for use within a specific condition (e.g., Vogt et al., 2017 regarding epilepsy surgery assessment), or too wide, that is, regarding clinical psychology reports more broadly (e.g., Schneider, Lichtenberger, Mather, & Kaufman, 2018) to holistically assess assessment quality. Existing recommendations targeted specifically to neuropsychological assessment and report writing practice (e.g., Board of Directors (AACN), 2007; Donders, 2001; Gorske & Smith, 2009; Pope, 1992; Postal & Armstrong, 2013; Tzotzoli, 2012) have yet to be operationalized into a set of auditable quality standards limiting their utility in busy, routine clinical practice, which is what this paper has set out to achieve.

Aims

1. To present a set of proposed (core and supplementary) audit standards to measure the quality of neuropsychological assessment practice for services to use as a self-assessment audit tool.
2. To provide recommendations for services wishing to implement the audit tool by using our learning from previous administrations and revisions.

Methods

A literature search of peer-reviewed publications was conducted (using the PsychInfo database) in March 2019 in an attempt to find an established set of audit standards applicable to neuropsychological assessment practice across services. The adopted search terms were "Neuropsychology," "Assessment," "Standards," and "Guidelines" combined with the Boolean

operator "AND." Further synonyms and subordinate terms were incorporated using the Boolean operator "OR." These being, for the neuropsychology terms: "memory," "functioning," "recognition," "impairments," and "cognition"; for the assessment terms: "effort test∗" or "cogniti∗ screening," "psychometric assessment∗," "cogniti∗ testing," "memory test∗," and "neuropsychological assessment∗"; and for the standards and guidelines terms: "standards," "guidance," "guidelines," "best practice," "national standard∗," "local standard∗," and "benchmark standard∗."

Further, colleagues were approached from within and outside of the service through networks of the DoN (the neuropsychology division of the BPS), through a local neuropsychology special interest group, via relevant U.K. clinical neuropsychology practice Facebook groups, and via Twitter, asking about any standards which may already exist. The BPS Committee on Test Standards promotes standards around qualifications and competencies of test administrators and test development, but these do not relate specifically to neuropsychological assessments, or their administration (BPS, 2020).

No set of applicable audit standards was found through any of these routes; therefore, a new set of 17 pilot audit standards was compiled to assess the degree to which neuropsychological assessments follow consistent procedures to: gather sufficient information to describe neuropsychological function holistically and account for extraneous variables which may affect test scores; optimize patient information, consent, and satisfaction; maximize report clarity and impact; and appropriately document clinicians' work. Compilation of standards was guided by colleagues, anecdotal patient feedback, and the best practice literature (see Table 1 for source references within the audit standards table).

A research intern under the supervision of a qualified clinical neuropsychologist used these standards to audit 30 assessment cases, which was agreed to be a manageable number of cases to audit yet would yield a good breadth of data. Retrospective data obtained from electronic patient records were analyzed for all audited assessment cases, all of whom were adults (age: 16+) who had been referred to a large clinical neuropsychology service for testing for a variety of reasons (to support diagnosis, pre-surgical assessment, to describe patterns of deficit, and inform rehabilitation interventions) and across diagnoses (traumatic brain injury, tumor, epilepsy hemorrhage, dementias, etc.). The first 10 neuropsychological assessments of 87 which were conducted between February and April 2018 were audited and then a further 20 cases were hand-selected in order to gain representativeness across clinical teams and diagnoses within the service.

Findings were disseminated to the broader clinical service for discussion and refinement of audit standards. Some methodological and procedural issues were raised (e.g., the appropriateness of an intern without specialist training making judgments about audit standard compliance, some of which might be subject to clinical discussion requiring specialist knowledge; additional standards which could have been included in the audit).

Two of the authors, in developing the audit tool for feasibility and applicability, trialed an earlier version using 18 neuropsychological assessment reports in a clinical service in the north east of United Kingdom using 45 audit standards. Merging both sets of standards resulted in 36 standards. The merging process excluded those standards from the two audits which overlapped, those which focused more on the administrative elements of the report (e.g., font size and letter headings), those deemed not to be widely generalizable to different services offering neuropsychological assessments (e.g., pertaining to individual organization systems and procedures), and those not easily amenable to retrospective audit methodology using written or electronic patient records.

The audit was then re-run in January 2020, with the 36 refined (merged) standards, which took the total audited patient population to $N = 78$. Retrospective data were audited from 30 new assessment cases (of 78 cases assessed between February and July 2019) using the same sampling methods as mentioned before to ensure all specialisms within the service were represented. A trainee clinical psychologist (completing doctorate level training), under the supervision of a clinical neuropsychologist (the lead author), divided standards into "core" and "supplementary" standards and further sub-divided them into "process standards" and "report style and content standards." Findings were disseminated to the team and the NHS Trust's audit department using descriptive statistics to illustrate percentage rates of compliance for each standard. Practice recommendations were also offered, which have subsequently been implemented, the effects of which are planned to be assessed in a re-audit in 2 years' time.

We liaised with experienced clinical neuropsychologists from two other services (a young-onset dementia service [for adults aged <65 years] and a memory assessment service for adults aged >65 years) for clinician opinions on the applicability of the audit tool. This feedback was used to add in two further standards (surrounding consent and wearing visual/hearing aids) and also to refine our judgments of which proposed standards were deemed to be "core" and "supplementary." Further, going through the helpful process of editor and peer review when submitting this article for publication to ACN gave rise to the inclusion of an additional standard regarding the use of consistent test score labels, which although as yet has not been trialed in a service audit, was felt to be an important inclusion. This then completed the process of collating the final 39 standards that make up the proposed audit tool (see Table 1).

Table 1. Yes/no tick list of audit standards (with source references)

1a. Process standards (core)	Yes	No
1. An initial clinical interview was completed (Lezak, Howieson, & Loring, 2012; Strauss, Sherman, & Spreen, 2006; Watt & Crowe, 2018)		
2. The purpose of the assessment and what to expect in the testing session was discussed with the patient and documented (Board of Directors (AACN), 2007; British Psychological Society (BPS), 2019b; NHS England, 2017; Strauss et al., 2006)		
3. Informed consent to proceed with testing (written or verbal) was obtained and documented, or where capacity to consent was lacking, a Best Interests decision was documented (Board of Directors (AACN), 2007; BPS, 2017, 2018a; Mental Capacity Act, 2005; Strauss et al., 2006)		
4. Checks were made with the patient about usual visual/hearing aids, that they were used/worn used during the assessment OR commenting on potential effects of their absence (Lezak et al., 2012; Strauss et al., 2006)		
5. Testing was completed by appropriately qualified professionals and under appropriate clinical supervision in accordance with relevant guidance (in the United Kingdom, the BPS requires Graduate Basis for Chartered membership and states 1-hr supervision per week for a full-time assistant psychologist) (American Psychological Association (APA), 2014; Board of Directors (AACN), 2007; BPS, 2017b; International Test Commission, 2001)		
6. A face-to-face (or video-call) feedback session was offered (NHS England, 2017; Pope, 1992; Postal & Armstrong, 2013; Poston & Hanson, 2010; Rosado et al., 2017)		
7. A report detailing test outcomes and interpretation was written (Donders, 2001; Lezak et al., 2012; Mountjoy et al., 2017; Schoenberg & Scott, 2011)		
8. Where ethnicity or cultural factors are identified, the impact of this in relation to specific tests are considered (e.g., how this may affect the effort or render scores invalid) (APA, 2014; Board of Directors (AACN), 2007; Brickman, Cabo, & Manly, 2006; Lezak et al., 2012)		
Cultural issue identified and commented upon		
Cultural issue identified and not commented upon		
No obvious cultural issue present		
No report produced		
1b. Report style and content standards (core)	Yes	No
1. The report is concise, not exceeding four sides of A4 (or insert report length for the individual service as appropriate) unless clinically necessary (Donders, 2001, 2016; Postal et al., 2017; Strauss et al., 2006)		
2. Where appropriate, technical, or scientific terms are applied accurately and unambiguously. Acronyms or difficult terms are explained/defined in the report (APA, 2014; British Psychological Society, Division of Neuropsychology (BPS DoN), 2012; Griffin & Christie, 2008; Lezak et al., 2012)		
3. Includes a concise summary and conclusions section that draws the reader's attention to the key points (Donders, 2001, 2016; Gorske & Smith, 2009; Postal et al., 2017; Tzotzoli, 2012)		
4. Provides a clear description of the purpose of the referral/referral question (Donders, 2001, 2016; Griffin & Christie, 2008; Tzotzoli, 2012)		
5. Qualitative descriptions of the patient's mental health is corroborated with self-report mood measure(s) (Lezak et al., 2012; Strauss et al., 2006; Vogt et al., 2017)		

(Continued)

Table 1. Continued

1a. Process standards (core)	Yes	No
6. Previous medical history is documented in the clinical notes and considered within the report where appropriate (Includes a summary of the patient's past and present physical health and medical history, or clearly points to where this can be obtained; i.e., a previous letter.) (Lezak et al., 2012; Tzotzoli, 2012)		
7. Current medications are documented in the clinical notes and the effects considered. Where relevant, this is documented in the report (e.g., If they are likely to alter cognition?) (Boake, 2008; Board of Directors (AACN), 2007; BPS, 2019c; Lezak et al., 2012)		
8. Educational/vocational background was asked about and considered (as evidenced in clinical notes and/or neuro report) AND/OR a test of premorbid functioning was completed (Board of Directors (AACN), 2007; Boake, 2008; Lezak et al., 2012)		
9. Outlines the patient's current living circumstances, social history and, if relevant, family history of medical difficulties (Gorske & Smith, 2009; Lezak et al., 2012; Strauss et al., 2006; Tzotzoli, 2012)		
10. Points made are backed up with examples/data (e.g., direct quotations and test scores) (Schneider et al., 2018; Tzotzoli, 2012)		
11. Process observations are taken during testing and considered in the report (e.g., fatigue, anxiety, and motivation) (Boake, 2008; BPS, 2019c; Lezak et al., 2012; Tzotzoli, 2012)		
12. Report contains evidence of formulation/ synthesizing/integrating data to reach clinical conclusions, for example, any potential confounding factors (e.g., depression, anxiety, and fatigue) are outlined, as well as their potential implications for test validity (APA, 2014; Board of Directors (AACN), 2007; Gorske & Smith, 2009; Jurado & Pueyo, 2012; Mountjoy et al., 2017)		
13. Objective assessment of performance validity (effort) is evidenced and referred to in the report (Bush et al., 2005; Heilbronner et al., 2009; Sweet et al., 2021; (both representing AACN); BPS, 2009, 2021; Lezak et al., 2012)		
14. Use of consistent test score labels/descriptors to describe test scores, agreed across the service (e.g., extremely high score, high score, above average score, average score, below average score, low score, and extremely low score) (BPS, 2018b; Guilmette et al., 2020)		
15. Conclusions make sense in the context of the report: They are well formulated based on the evidence gathered in the assessment (BPS, 2019c; Donders, 2016; Schoenberg & Scott, 2011)		
16. The patient's views/comments/opinion from their verbal feedback is reflected appropriately in the report where appropriate (Griffin & Christie, 2008; Lezak et al., 2012; Mountjoy et al., 2017; NHS England, 2017; Pope, 1992; Rosado et al., 2017)		
17. Report concludes with recommendations (e.g., for symptom management/referral on/further clinical input/discharge from the service) (Board of Directors (AACN), 2007; Postal et al., 2017; Tzotzoli, 2012)		
18. Patient is copied into report (unless they express a wish not to receive it, or can access their own medical records) (Academy of Medical Royal Colleges, 2018; Minhas, 2007; Newton, 2008; NHS England, 2018)		

1c. Process standards (supplementary)	Yes	No
1. Clinical notes made/held for every face-to-face session (APA, 2016; BPS, 2018a, 2019a)		

(Continued)

Table 1. Continued

	Yes	No
1a. Process standards (core)		
2. Feedback session offered in a timely manner (within 4 weeks of test completion, or insert timescale as appropriate to the individual service)		
(Board of Directors (AACN), 2007; Gorske & Smith, 2009; Pope, 1992)		
Feedback within 4 weeks		
Feedback outside of 4 weeks		
No report, no feedback recorded		
3. Where risk issues are identified during the process, the report outlines these and explains how they are being managed		
(APA, 2016; BPS, 2017)		
No risk identified		
Risk identified and reported on		
Risk identified and not reported		
No report written		
4. Discussions about whom the report is to be shared with are documented		
Board of Directors (AACN), 2007)		
5. A service leaflet detailing what to expect in the neuropsychological assessment was given		
(BPS, 2019b)		

	Yes	No
1d. Report style and content standards (supplementary)		
1. Uses informative headings or a clear structure that enable easy access to important information		
(Schneider et al., 2018; Tzotzoli, 2012)		
2. Writing style avoids repetition of information in the same sections		
(Donders, 2016; Schneider et al., 2018; Strauss et al., 2006)		
3. Reports observations/test performance on memory function (e.g., orientation, working memory, verbal, visual learning, autobiographical, recall/recognition, immediate and delayed, and prospective)		
(Schneider et al., 2018; Vogt et al., 2017)		
4. Reports observations/test performance on language skills (e.g., spontaneous speech, word-finding, reading, writing, repetition, comprehension, and naming)		
(Schneider et al., 2018; Vogt et al., 2017)		
5. Reports performance on tests/observations of attention/executive function (e.g., initiation, attention, fluency, rule adherence, set shifting, planning, approach to tests, ability to hold in mind test rules, inhibition, impulsivity, and empathy)		
(Schneider et al., 2018; Vogt et al., 2017)		
6. Reports observations/test performance on processing speed (e.g., speed of information processing, speed of responses, and motor speed)		
(Schneider et al., 2018)		
7. Reports observations/test performance on visuospatial abilities (e.g., line orientation, figure copy, visual scanning, drawing, and clock drawing)		
(Schneider et al., 2018; Vogt et al., 2017)		
8. Summary of findings from range of different sources (e.g., collateral data, clinical history, session observations, and test scores) and congruence between sources		
(Schneider et al., 2018; Schoenberg & Scott, 2011; Tzotzoli, 2012)		

Results

A Proposed Audit Tool for Neuropsychological Assessment Practice

The outcome of our literature searches and audit trials is a proposed audit tool comprising 39 standards against which services can assess their neuropsychological assessment and report writing practice (see Table 1). Standards are split into those assessing neuropsychological assessment processes (process standards) and those assessing the report itself (report style and content standards). Twenty-six core standards are proposed (8 process and 18 report style and content standards) to be included in any service's audit of neuropsychological assessment practice. Further, 13 supplementary standards (5 process and 8 report style and content) are also offered, which services may opt to include depending on their individual applicability. Services may also wish to add in their own additional standards with local applicability.

Step-by-Step Audit Tool Guide

- Step 1—Select any of the supplementary audit standards to add the 26 core standards plus any additional locally agreed standards you may wish to include in your service's audit.
- Step 2—Register the audit, as required, with the appropriate governing body/NHS Trust/governance department/health-care provider/hospital trust.
- Step 3—Select the assessment cases to be audited. The authors recommend 20–40 cases representing all clinicians providing neuropsychological assessments within the service in order to obtain a reasonably diverse range of practice across the service. Selecting cases assessed 3–6 months ago is recommended, so as to capture current practice, but ensuring that assessments will be finished, with verbal feedback and a written report completed (where appropriate). Random selection of cases is advised (e.g., using random number tables) by a non-clinical member of staff (e.g., a member of administrative staff or manager).
- Step 4—Complete the yes/no tick list (see Table 1) for each of the selected core and supplementary standards for each audited case. Two auditors working together is a recommendation, with one of these to be a qualified clinical psychologist/neuropsychologist.
- Step 5—Calculate percentage compliance for each standard.
- Step 6—Discuss as a team the outcomes of the audit particularly any standards where 100% compliance was not achieved and any practice changes to be implemented to improve compliance with the audit standards.
- Step 7—Implement any agreed practice changes.
- Step 8—Re-audit to assess the effects of implemented changes (a period of 12–24 months is recommended) to complete, and restart the audit cycle.

A Microsoft Word document of the audit tick list plus a record sheet on which to summarize audit findings are available from the lead author upon request. These documents will also likely be made available as a self-assessment/peer-review audit tool from the BPS DoN policy document library in due course.

Discussion

An audit tool comprising 39 (core and supplementary) quality standards is proposed for services providing neuropsychological assessments to assess their practice, or for use as a peer review tool, in order to improve practice. Having trialed and refined the audit tool over three separate administrations, the authors are now able to offer several recommendations for administration.

First, prior to registering and commencing the audit, clinical teams are advised to meet to discuss which audit standards will be included. This has (in the authors' experience) been a fruitful exercise resulting in: the inclusion of standards not initially considered; reflection upon our reasons for including/omitting certain standards; revised standards to reflect diverse practice within the profession of clinical neuropsychology; and increased colleague "buy-in," which was helpful when later feeding back audit findings and proposed practice changes.

A second recommendation is that the audit should be carried out by two auditors, one of whom should be a qualified clinical psychologist or registered clinical neuropsychologist (in the United Kingdom, entered onto the BPS Specialist Register of Clinical Neuropsychologists). Using multiple raters enables appraisal of inter-rater reliability, and further work to refine the audit tool should include objective metrics of inter-rater reliability and the ability to discuss qualitative data, which may not easily fit into simple yes/no audit judgments. One early administration of the audit undertaken by an undergraduate research

intern highlighted that using just a single, inexperienced auditor gave rise to some inconsistencies in data interpretation. This made it more difficult to confidently feed results back to the team. Whereas, in the latest administration, completed by a trainee clinical psychologist under the close supervision of a qualified clinical neuropsychologist, audit data were clearer and more robust, thus more impactful.

For the second auditor to be less well qualified is also worthy of consideration, given that the audit administrators in this study described the process as a great learning experience and that it was a privilege and a rare opportunity to read colleagues' reports and learn from them. Audit administration is also an excellent CPD/CE activity for qualified clinical psychologists and neuropsychologists.

Third, keeping process observations of points to note/gray areas requiring further discussion during the data collection phase was helpful to increase the efficiency (i.e., targeting data to revisit/speedily clarifying points of uncertainty). The tick list Word document (included as supplementary material submitted along with this paper) includes a column for noteworthy observations, examples of particularly good or poor practice, or points requiring further clarification. Process notes were also helpful when offering later personalized feedback (upon request) to individual clinicians/specialties within the larger service and helped to provide richer data for the dissemination of results and report content (e.g., by providing examples and justifying conclusions).

The authors further recommend feeding back audit findings as a presentation using descriptive statistics (e.g., compliance percentages/pie charts) to the whole team. Our experiences of such feedback meetings are that they have been felt to be a worthwhile process in terms of the following:

- Highlighting areas of practice that are good and those which require improvement.
- Inculcating a team spirit of a willingness to experience discomfort surrounding areas of practice, which falls short of expected standards in the service of a commitment to continual service improvement.
- Discussing required practice changes and how to implement them.
- Addressing areas requiring improvement (with all clinicians at different stages of their careers).
- Introducing a re-audit (in 12–24 months) and discussing any new or revised standards.

Anecdotal evidence suggests that the feedback presentation alone is an effective intervention to improve adherence to audit standards and to raise awareness of areas requiring improvement, thus resulting in improved practice. Further concrete practice changes have been implemented in audited services, including establishing an electronic checklist for neuropsychological assessment referrals (to assistant psychologists), ensuring that many audit standards are prompted for at the initial interview. The checklist also prompts referring clinicians to tick yes/no regarding standards, such as inclusion of a performance validity test/mood measure, etc., requesting reasons to be given for any omissions on the checklist. Also arising from the audit, a "tracker" spreadsheet for all referrals has been devised and implemented in one audited service to facilitate efficient collection of service data useful for future audits, such as whether the feedback appointment was booked within the agreed timescale post-testing.

A further worthwhile reflection on the audit process is that clinicians may feel exposed in having their practice scrutinized/audited. The authors feel empathic about this potential reaction as clinical neuropsychologists often work independently and are often unaccustomed to direct peer observation or scrutiny of their practice. These feelings can be minimized by spending time before the audit, creating a culture of psychological safety where openness, transparency, and driving up quality are valued without fear of repercussions. A balanced approach is required to ensure colleagues do not feel criticized, or feel the need to defend their current practice, while also enabling them to identify and address any areas of poor practice. When feeding back results, it is therefore important to both anonymize data when presenting back at a group level and provide individual, confidential feedback in order to improve clinicians' practice where required.

Some apprehensions were also raised about publishing audit results within this paper. The authors are of the opinion that audit data are part of an internal review process to drive learning and improvement within the service and not for the primary purpose of contributing to the research literature. Therefore, no audit results are included in this paper. Services wishing to take the process of improvement beyond their own service could however use the audit tool as part of an external peer review process, inviting objective perspectives on their practice, with prior consent of all clinicians within the service.

The authors were surprised by the paucity of the literature identified focusing on evaluating and improving the quality of neuropsychological assessment practice, given that it is the "core business" of our profession. Therefore, we plan to continue this work, particularly by seeking and listening to service user experiences (as in Griffin & Christie, 2008; Mountjoy et al., 2017) and to use these perspectives to guide service developments (Postal et al., 2017). Future directions could also focus upon the changed landscape of assessment practice in light of COVID-19 and minimum standards for, or patient experiences of, remote assessments and feedback sessions.

One limitation of this study was the use of clinical audit methodology that relies on binary pass/fail (yes/no) judgments, which may be reductionist when applied to large quantities of mostly qualitative data. For example, an issue arose about whether the only way to determine the validity of test scores was to complete an objective performance validity test, whereas a clinician may

opt (for say brevity of the assessment battery due to client fatigue) to use observations and recognition memory scores to reach an opinion on this point. The use of two reviewers per audit, with an agreement to take issues that cannot be resolve to a third party, could address this methodological point.

The sample size ($N = 78$) was obtained over three administrations of evolving iterations of the audit tool. The authors wished to share our work with other clinicians and services so they could benefit from this, albeit continuing, work, so further validation with the latest proposed version is required. A further improvement to this study would have been adherence to a controlled, validated systematic review protocol in line with the PRISMA guidelines (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009) for the initial searches, using wider search terms and multiple databases, which time did not allow for in this initial project. A more systematic search could form the basis of a potential future study toward refining and improving the audit tool.

The authors' wish the proposed tool to be of use within diverse services offering neuropsychological assessments, without being too prescriptive, yet upholding a minimum level of practice quality across neuropsychological assessment practice regardless of the specifics of the service.

The proposed tool has generated considerable interest from other services and clinicians but is as yet a work in progress. Further work to improve and refine this work (encompassing systematic searches, wider consultation with service users and colleagues to achieve consensus guidelines, and checks on inter-rater reliability) is planned in collaboration with the BPS's DoN.

Individual services may opt to add in their own locally applicable standards, or other more widely applicable standards that we have not yet considered. Further suggestions received from the reviewers/editors when submitting this paper for publication included adding in a supplementary standard on the assessment of vigilance/sustained attention and to consider revising how required domains to be assessed are grouped within the standards (e.g., whether processing speed and working memory are to be included within the attention/executive function domain, or added as individual standards). Services using the audit tool may of course add in these suggestions within their individual audits, and these will be considered for the next iteration of the audit tool, with invitations for commentary. The authors extend this invitation to the ACN readership and welcome any feedback on potential areas of bias or omission, or any other comments about the tool, positive or otherwise, to contribute to its refinement and improvement.

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Conflict of Interest

None declared.

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