



Short communication

The utility and benefits of clinical neuropsychology in Asia

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ABSTRACT

Neuropsychological evaluation is the clinical practice of identifying and measuring impairments in mental functions in the context of a patient's mental strengths and preserved abilities for the purposes of diagnosis, rehabilitation planning, and long-term care. Best practice approaches to the medical management of neurodegenerative, neurological and psychiatric illness have lead to increasing demand for neuropsychological services. The simultaneous challenges of Asias' increasing adult and rapidly ageing population underscore the need for consideration of the role of neuropsychological services in day-to-day clinical practice. Here, we outline the clinical utility of neuropsychological assessment and indications for its use in general psychiatric practice.

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1. Introduction

Neuropsychology is a relatively new scientific discipline that bridges the fields of psychology, neurology and psychiatry. Clinical neuropsychology, the clinical specialisation of the discipline, is the application of knowledge of human brain-behaviour relationships to the diagnosis, rehabilitation and long-term management of people with impaired brain function. As an extension of the mental status examination, neuropsychology provides a quantitative, accurate and comprehensive means of identifying and measuring subtle impairments in cognitive, sensory and motor functions, judging such impairments in relation to preserved abilities and evaluating their influence on educational, vocational and social functioning. The appropriate application of neuropsychological evaluation in diagnosis and intervention can also help to alleviate the significant emotional consequences of disordered brain function that impact negatively upon patients, their families and society as a whole.

2. History of a modern profession

Clinical neuropsychology, as a modern profession, emerged disparately from 19th century neurology and psychology partic-

ularly following from developments in psychometrics in the early 20th century. Although the profession developed simultaneously in numerous countries from the 1940s and 50s, it gained impetus from 1940s in the USA from investigations of language and cognitive disorders arising from combat related brain injuries in WWII and was further developed from key neurosurgical and neurocognitive case studies at the Montreal Neurosciences Institute in the 1950s and London's Hospital for Neurological Illnesses in the 1960s and 70s. Today, doctoral neuropsychologists can be found in public and private hospital departments, community centres and in private practice across the world. In Asia, neuropsychologists and clinical psychologists with a background in neuropsychology are practicing in major public and private hospitals as well as private practice.

3. Clinical utility of neuropsychological assessment

Neuropsychologists assess a range of disorders including neurodegenerative illness, acquired and developmental neurological conditions as well as metabolic and psychiatric disorders. Mental functions are assessed through the application of standardised normative cognitive testing of the major mental functions that form part of the mental status component of the neurological examination. Depending upon the referral question, a broad quantitative neuropsychological evaluation can involve tests of intellectual function, sensory-perceptual functions, sustained and divided attention, expressive and receptive language, short term, episodic and remote memory, ideational and constructional praxis, and a range of so-called 'executive' functions that

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include abstraction, concept formation, problem-solving and mental flexibility.

The principal advantage of this methodology is the ability to compare patients' abilities to the normal range of function expected of a healthy person of the same age, sex and education. Results are then examined in the context of sensory impairments, education level, socio-economic status, cultural background and the patient's primary language. These methods, in conjunction with a comprehensive clinical history, yield more accurate information of relative decline or improvement in function. Further, the neuropsychologist's broad-based evaluation of mental functions allows description of a patient's relative strengths and weaknesses, areas of deficit and preserved ability. Analysis of the resulting cognitive profile facilitates diagnostic clarification and allows for the characterisation of impairments in terms of acuteness, severity, lateralisation, localisation, chronicity, progression and likely course.

4. Indications for neuropsychological assessment

4.1. Functional or organic syndrome?

An important goal of neuropsychological assessment in the psychiatric context is in distinguishing organic from functional impairments. Depression, whether primary or reactive, is often associated with impaired cognition and often with the appearance of dementia. Patients may complain of vague memory or concentration problems in the context of anxiety and decline in social function and self-care. Such complaints are often wrongly ascribed to depression when in fact they may indicate a more serious problem (Jonker et al., 2000). Conversely, depressed patients routinely complain of problems in attention and concentration yet may not identify such problems as mood related. Given that relatively mild depression can be associated with impaired performance on cognitive tests (Ravdin et al., 2003), and that up to 50% of dementia patients experience some degree of depression (Yesavage, 1993) formal testing of cognition should be considered in depressed adults where dementia is a possibility.

4.2. Acquired brain injury

Acquired brain injury spans a large group of disorders that affect cognitive function. These include traumatic brain injury sustained in accidents and assaults and non-traumatic brain injuries including stroke, central nervous system infection, toxic encephalopathy, hypoxia and substance abuse. Of these, traumatic brain injury (TBI), according to the World Health Organization, will surpass many diseases as the major cause of death and disability by the year 2020 and is most common in low and middle GDP countries that have greater preponderance of risk factors.

In the acute stages following TBI, neuropsychologists are sometimes called upon to determine the severity of posttraumatic amnesia (PTA). PTA, the transient state of disorientation associated with anterograde amnesia, is principally characterised by the inability to lay down new memories following the traumatic event. Other features of PTA may include behavioural problems, fatigue, restlessness, agitation, disinhibition, violence or psychosis (Ahmed et al., 2000). Duration of PTA is a reliable marker of injury severity and predicts cognitive behavioural and psychosocial outcome (Haslam et al., 1994). The only reliable means of establishing when PTA has resolved is to determine when continuous memory returns. Ongoing assessment of PTA using a standardised scales, such as the Australian Westmead PTA scale (Shores et al., 1986), throughout the acute period following brain injury is essential to making informed decisions about competency to consent to medical treatment, discharge, rehabilitation planning and placement.

Once the acute effects of TBI have resolved, the long-term functional sequelae are assessed in the context of injury severity, age, premorbid cognitive capacity and post-morbid complications in order to make predictions of future improvement or decline. In conjunction with psychosocial capacity, these factors affect therapeutic planning, rehabilitation, recovery and return to work (Wilson, 2000). Ongoing behavioural problems, including disinhibition, insensitivity, social inappropriateness and issues relating to treatment compliance and work reintegration, require careful management guided by the cognitive capacities and limitations of each individual. As such, a significant aspect of the neuropsychologists workload is referral and ongoing liaison with families, and community agencies that specialise in reintegrating brain injured people to society.

Often neuropsychological evaluation is used in the medico-legal context of traumatic injury. Typically, opinions are sought regarding the extent and severity of cognitive impairment and its effects upon social, educational and vocational outcome. Discerning minor traumatic injury from feigned or exaggerated brain injury, discriminating emotional from organic factors associated with trauma and determining the likelihood of functional recovery are typically the work of clinical neuropsychologists in private practice. Medico-legal assessments are particularly taxing on the neuropsychologist as the testing regime is typically 3–4 h followed by a comprehensive report. In many countries, neuropsychological opinion is now viewed as a necessary component of determining the legitimacy and extent of litigation and compensation claims.

In addition to TBI, the other major cause of mortality and acquired brain injuries in Asia is from cerebrovascular accidents. Prevalence studies show increases in the rates of both major stroke and cerebrovascular infarction that vary from country to country (Thammaroj et al., 2005). Such events have lateralised effects on sensory, language, motor and intellectual functions. Even transient ischaemic attacks may have significant long-term effects on cognitive function that, if detected early, may lead to better prevention of further decline (Tham et al., 2002). Neuropsychological evaluation plays an important role in delineating the anatomical basis of vascular events and assists in determining capacities for self-care and independent living as well as emotional, social and vocational consequences. Post-stroke neuropsychological rehabilitation programmes focus on retraining people to externalise functions that would previously been automatic. Return to work issues, such as fatigue, poor memory or concentration can be addressed through structuring daily routine, reducing workload and external aids.

4.3. Normal ageing, mild cognitive impairment and dementia

Although some healthy ageing persons maintain high levels of cognitive ability throughout life, most older people will experience a decline in specific cognitive abilities within the context of otherwise normal activities of daily living (Petersen et al., 1994). Age-related cognitive decline is associated with deterioration in memory and learning, attention and concentration, thinking, use of language, and other mental functions (APA, DSM-IV-TR, 2000). Risk factors include advancing age, female gender, and prior cardiovascular events. Whilst such changes do not necessarily herald the onset of an early degenerative disease, people with diagnostically established mild cognitive impairment (MCI) are at elevated risk of developing organic dementia as approximately 80% will develop Alzheimer's disease within 10 years of first complaint—a rate of approximately 10–15% per year (Collie and Maruff, 2000).

Neurodegenerative disease is a major challenge to many societies in the Asia Pacific region (Wimo et al., 2003). Whilst dementia prevalence is broadly similar in Asia compared to Europe and North America, an excess of some forms of dementia,

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