

Alzheimer's disease dementia
Hamid R Sohrabi, MAPS, PhD
School of Medical Sciences, Edith Cowan University

Dementia, cognitive decline, and Alzheimer's disease (AD) currently present a huge economic and emotional burden to Australia. In 2002-2003, the economic cost of dementia in Australia was estimated to be \$6.6 billion (Access Economics, 2009). Furthermore, by 2016 dementia is predicted to be the major cause of disability burden in Australia and it is expected that by 2040 more than 500,000 Australians be diagnosed with dementia (Pachana & Helmes, 2010).

Dementia is not a specific disease but rather a syndrome that has various causes. Dementia refers to significant, general cognitive decline or behavioural changes that interfere with a patient's ability to maintain and perform the so-called activities of daily living. Alzheimer's disease is the most common cause of dementia and was described by Dr Alois Alzheimer, a German psychiatrist and neuropathologist, more than a century ago. Over the last 100 years, our knowledge has come a long way in relation to understanding the underlying mechanisms of the disease and the criteria that should be utilised for diagnosis. The current diagnostic systems usually differentiate between Alzheimer's disease, as a neuropathological condition resulting in neuronal death in the brain, and dementia due to Alzheimer's disease. The most recent criteria were introduced by the US National Institute on Aging and the Alzheimer's Association (NIA/AA) workgroup in April 2011. The new criteria emphasises the gradual manifestation of the signs and symptoms and the "clear-cut" worsening of the so-called *cognitive functions* including memory, language, thinking, judgement, decision making, problem solving, and spatial recognition abilities such as object identification, face recognition, and so on (McKhann, et al., 2011). In addition to cognitive decrements, AD dementia may manifest by changes in personality or behaviour such as uncharacteristic mood fluctuations (e.g. agitation), social withdrawal, decreased interest in previous activities, and socially unacceptable behaviours (McKhann et al., 2011).

While the criteria for AD dementia are clear and based on the latest scientific investigations, clinical diagnosis is still a challenge, resulting in incorrect diagnosis. In fact, a report to the American Academy of Neurology's 63rd Annual Meeting in April 2011 revealed that about half of those diagnosed with AD dementia, did not show enough AD-associated neuropathological changes post-mortem to warrant this diagnosis. That is, half of those diagnosed and even treated for AD might not have AD! In addition, while the best intervention seems to be of preventive nature, we still cannot properly screen those who are at higher risk for developing AD. As a result, many drug trials may fail because we do not target the best potential population.

Therefore, accurate and early diagnosis is one of the prime goals of the scientists involved in AD research. It is believed that refining the diagnostic tools will increase our chances of successful drug trials. The current advances in brain imaging are very promising and while these diagnostic techniques are still under investigation, scientists are considering them as a significant progression.

References

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