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The role of cognitive impairment in general functioning in major depression

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ABSTRACT

The association between cognitive performance and general functioning in depression is controversial. The present study evaluated the association between cognitive dysfunction and major depressive disorder (MDD, $N=70$) as compared with age- and gender-matched healthy controls ($n=206$) and its relationship to general functioning (physical and mental health quality of life, activities of daily living, and employment status) in participants with current MDD ($n=26$) and those with previous MDD only ($n=44$). Participants were assessed clinically using the Mini International Neuropsychiatric Interview (M.I.N.I.) for the depression groups and the Diagnostic Interview for Psychoses (DIP-DM) for the control group. Measures to evaluate cognition and quality of lifes comprised the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), the Short Form-36 Health Survey Questionnaire, and the Activities/Instrumental Activities of Daily Living (ADL/IADL); employment status was also assessed in MDD. The results showed that a) while individuals with current depression had worse cognitive performance in all domains than healthy controls, those individuals with previous depression had lasting cognitive impairments in the domains of immediate memory and attention as compared with healthy controls; b) individuals with current depression had lower scores in the visuospatial/constructional and attention domains and the total score than individuals with previous depression; c) individuals in the depression group as a whole who were currently unemployed had significantly lower scores in all domains (except attention) of cognitive function; d) cognitive function was not related to either physical or mental quality of life or impairments of activities of daily living (ADL, IADL); e) that unemployment in previous depression was related to poor cognitive function similar to those with current depression. The results indicate that MDD may have detrimental and lasting effects on cognitive performance partly related to poorer general functioning.

1. Introduction

Depression is a severe and common psychiatric disorder affecting millions of people worldwide (Murray and Lopez, 1996; Ustun et al., 2004; Andrews et al., 2005). Although this psychiatric disorder primarily involves mood disturbances, cognitive impairment is now a well-established feature of major depression (Austin et al., 1992, 2001; Den Hartog et al., 2003; Porter et al., 2007). Although the exact neuropsychological profile remains to be fully elucidated, research has shown neurocognitive deficits in patients with depressive disorders in the following cognitive domains: executive functioning (Elliott et al., 1997; Austin et al., 1999; Paelecke-Habermann et al., 2005; Porter et al., 2007), attention and attentional set shifting (Purcell et al., 1997; Ravnkilde et al., 2002), memory (Austin et al., 1992; Harmer et al., 2002), visuo-spatial processing and psychomotor function (Mondal et al., 2007). Further evidence would suggest that the cognitive function in patients with recurrent depression declines with each successive episode of depression (Basso and Bornstein, 1999; Stordal et al., 2004). Research by Airaksinen et al. (2004) would also suggest that depressed patients display decreased cognitive functioning long after the remission of depressive episodes. Such evidence suggests that there may be pervasive and long-lasting effects of depression on cognitive ability; although this association remains to be fully clarified (Miller et al., 1991; Grant et al., 2001). Moreover, there is now evidence to suggest that these persistent neurocognitive deficits might impact the ability for some individuals with depression to functionally recover (Jaeger et al., 2006).

Since research in depression has traditionally investigated the impact of depressive symptoms on quality of life (Meltzer-Brody and Davidson, 2000), little is known about the relationship between cognitive impairment associated with depression and general functioning and quality of life. In brief, it has been shown that an increase in depressive symptoms is associated with a decrease in quality of life (Vaughn McCall et al., 1999; Gostautas et al., 2006), and that chronic recurrence of depression is associated with prolonged dysfunction

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(Schwenk et al., 2004). Furthermore, a recent study suggests that the relationship between depression and impaired activities of daily living (IADL) is mediated by deficits in executive function (Kiosses and Alexopoulos, 2005).

In the context of functioning in depression, it is important to note that after treatment a large number of patients remain partly symptomatic (50% of treated cases achieve full remission), experiencing decreased social activities, work performance and well-being (Zajecka, 2003). Furthermore, reduced general functioning and performance in non-remitted depression causes an economic burden with direct treatment costs that are up to 49% higher than in fully remitted patients in the first year after the depressive episode (Simon et al., 2000). The role of cognitive dysfunction in the relationship between work performance and remission of depression remains unclear. More insight into the mediating role of cognitive dysfunction in general functioning among depressed patients might have far-reaching implications for the treatment and management of depressive disorders, which currently focuses on reducing mood-related symptoms and not cognitive dysfunction.

Hence in the present study, the association between cognitive dysfunction and general functioning (physical and mental health quality of life (QoL), activities of daily living, employment status) in individuals with depression was evaluated. The specific aims of the study were:

1. To investigate the association between cognitive dysfunction and MDD as compared with a healthy control group;
2. To investigate the effects of current versus previous MDD on domains of cognitive function.
3. To investigate the relationship between cognitive performance and quality of life, impairments in activities of daily living (IADL, ADL) and employment in MDD.

2. Methods

2.1. Participants

2.1.1. Depression sample

Participants were recruited from community and outpatients services in the Townsville Health Service District. Patients were re-contacted for the purpose of this study after they had been registered for current or previous depression. Each person gave written informed consent before the study began. Inclusion criteria for the study were 1) above the age of 18 and under the age of 80, 2) adequate reading and writing skills and the ability to speak the English language, and 3) current or history of major depression. Exclusion criteria included 1) schizoaffective disorders, 2) dementia, and 3) neurodegenerative and neurological illness. Dementia was excluded on the basis of cross-checking medical records (previous diagnosis of dementia/cognitive decline due to neurodegenerative disorders) and on the basis of the Mini Mental State Examination screening instrument (MMSE) (Folstein et al., 1975). Since all participants scored higher than 26/30 on the MMSE, dementia was excluded in this sample.

Of the 129 participants who were eligible for the study, 70 patients with MDD were included in the study (inclusion rate = 75.4%). The 23 patients who did not participate in the study were either not contactable, had difficulty in making an appointment for the interview or refused to participate. The participants showed no significant differences in gender or age from the non-participating eligible patients.

Data were collected over 4 months, from June 2007 to September 2007. For this analysis, only patients with a confirmed diagnosis of MDD were considered while patients with bipolar affective disorder were excluded from the analysis due to small sample size. The sample was divided into two groups: participants with current MDD and participants with previous MDD, currently not depressed. The subsample of currently depressed participants consisted of 26 individuals with at least one previous episode of depression, an age range of 20–65 (mean = 46.0, S.D. = 12.1) and with 11.1 years (S.D. = 1.1) of education on average. The second group consisted of individuals ($N = 44$) with a history of depression, but not exhibiting a current depressive episode at time of testing; age ranged from 23 to 77 (mean=44.2, S.D. = 15.9), mean education of 11.0 years (S.D. = 1.4).

2.1.2. Healthy control sample

Data for the present study were obtained through the "Using our Brains" (UoB) premortem tissue donor program between April 2002 and December 2007. The UoB program is administered through The New South Wales Tissue Resource Centre (TRC), a human brain banking facility established to provide brain tissue to research groups worldwide. Approval for the UoB program was obtained through the Human Research Ethics Committee at the University of Sydney and Sydney South West Area Health Service prior to the start of data collection. Members of the general public register their interest in the program either by telephone or at www.braindonors.org. Once informed consent has been obtained, donors participate in clinical and neuropsychological assessments. Participants were recruited through word of mouth, presentations at local community meetings and promotional activities. Persons with a known or suspected history of neurological illness, psychiatric disturbance, substance abuse or any other condition that could affect cognitive performance were excluded from the analysis. Participants completed the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) as part of the assessment process for the UoB program. The RBANS was administered along with a battery of other neuropsychological and clinical measures in the home of each donor. All tests were administered and scored according to the respective test manuals. The collection of the data followed the protocol as described in the Australian normative data study as recently published (Green et al., 2008).

2.2. Procedures

Three qualified psychologists were trained over three sessions in the administration procedures for all clinical assessment scales prior to commencement of the study. Refreshment training was provided 6–8 weeks after the study began. All scales were administered in a predetermined order (see below) during one session with an approximate duration of 2 h. Following each session, the investigators scored and quality ensured completeness and accuracy of each of the scales. The internal consistencies (Cronbach's α) were between 0.83 and 0.86 for the domain-specific composite scores. Thus, the neuropsychological scores had good reliabilities.

All data were entered into a data base using SPSS (Statistical Package for Social Sciences, Version 15).

2.3. Measures

The scales administered to the depression groups for the complete study included the following: Personal Health History Form (Ware and Gandek, 1998); Centre for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977); Personal Health Questionnaire-4 (Rizzo et al., 2000); Short Form — 36 Health Survey Questionnaire (Ware and Sherbourne, 1992); Medical and Psychiatric History (Rizzo et al., 2000); Hamilton Depression and Anxiety Scale combined (Hamilton, 1967); Mini International Neuropsychiatric Interview (MINI) (Lecrubier et al., 1998; Sheehan et al., 1998); Activities of Daily Living (Katz et al., 1970); Instrumental Activities of Daily Living (Lawton, 1969); Clinical Global Impressions (Guy, 1976); and Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) (Randolph et al., 1998; Randolph, 1999). In the control group, a subset of measures from the UoB assessment battery included the Diagnostic Interview for Psychoses (DIP-DM) (Jablensky et al., 1999) and the RBANS. While all participants completed a battery of assessments the current analyses used three of the earlier mentioned measures (see below).

2.3.1. Clinical assessment

2.3.1.1. Depression sample. The Mini International Neuropsychiatric Interview (MINI) is a short diagnostic tool (Lecrubier et al., 1998; Sheehan et al., 1998) designed to generate 17 Diagnostic and Statistical Manual DSM-IV or ICD 10 axis I diagnoses. In brief, the MINI takes approximately 30–45 min to administer and systematically explores the diagnostic criteria for the presence of a current DSM-IV axis I diagnoses. Reliability, sensitivity and validity were explored in a clinical population in a comparison with the Composite International Diagnostic Interview (CIDI) and against the SCID-P, a much longer Structured Clinical Interview for the DSM. The performance of the MINI in both cases was equivalent to that of the much longer interview (Lecrubier et al., 1998; Sheehan et al., 1998). Further validation was obtained from a multicenter study in Europe in which the diagnosis of general practitioners using the MINI after short 2–3 h training was compared with a specialized interviewer, with results yielding high concordance rates (Eytan et al., 2007). The MINI has therefore been widely used in more than 100 studies and translated into more than 30 different languages (Lecrubier et al., 1998).

2.3.1.2. Healthy control sample. The Diagnostic Interview for Psychoses (DIP-DM) (Jablensky et al., 1999) is a structured clinical interview for the diagnosis of psychotic disorders as well as assessing comorbid drug and alcohol abuse/dependence. The DIP-DM is designed to elicit information on current symptoms (past month), symptoms during the past year as well as a lifetime rating of symptoms. Diagnoses are classified under a number of systems including DSM-IV, allowing for a clear identification of participants into a "control" group.

2.3.2. Quality of life measure

The MOS-SF-36 was developed as part of the Medical Outcome Study in the 1980s and is a widely used measure of health status and quality of life (QOL) in both healthy and sick populations (Ware and Sherbourne, 1992). The survey can be self-administered or administered by a trained interviewer in face to face or telephone interviews to anyone older than 14 years and generally takes approximately 15–20 min to administer. The SF-36 consists of 36 single items yielding two compound measures (mental and physical summary score). The scores on both mental and physical domains range from a minimum score of 0 to a maximum score of 100. Reliability, validity and sensitivity of the SF-36 have been extensively examined. Cronbach's alpha of the SF-36