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Research report

Cognitive performance is impaired in euthymic Chinese patients with Bipolar 1 Disorder

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ABSTRACT

Background: Data from euthymic patients with Bipolar Disorder (BD) has shown cognitive impairment and the notion that sufferers of BD achieve full recovery between illness episodes is questionable. These findings have not been replicated in a Chinese population. The present study examined the cognitive profile of euthymic Chinese patients with Bipolar 1 Disorder (BD-1) and matched healthy control participants.

Methods: Euthymic patients with BD-1 and matched controls ($n=104$ in total) completed serial measures to assess mood and also completed an IQ test and the Central Nervous System Vital Signs (CNSVS) computerized battery assessing memory (verbal and visual), executive functions, attention, psychomotor and processing speed.

Results: Patients with BD-1 performed worse than controls on all cognitive domains. When using 2 or more scores below the 5th percentile as a cutoff for neurocognitive impairment, 46.2% of the patients with BD-1 and none of the control sample scored in this range ($p<.001$). Correlational analysis among the illness variables in BD-1 revealed that cognitive performance was inversely correlated with the number of manic episodes and duration of illness.

Limitations: It was not possible to determine the causal relationship between associated illness and performance. The effect of medication on cognitive performance requires further study.

Conclusions: Euthymic Chinese patients with BD-1 demonstrate marked cognitive impairments and these correlated with illness parameters. Cognitive impairment in BD may be independent of language and culture.

1. Introduction

Bipolar Disorder (BD) is associated with cognitive impairment during the acute phases (Martinez-Aran et al., 2004a) and this impairment persists even in the euthymic phase. A majority of BD patients demonstrate high rates of functional and cognitive impairment even during periods of sustained remission of mood symptoms (Wingo et al., 2009).

Marked impairments are reported in executive functioning and verbal memory performance in euthymic BD patients (Robinson et al., 2006). Deficits of similar magnitude have been reported in measures of executive function, verbal learning, immediate and delayed verbal memory, abstraction, sustained attention and psychomotor speed in BD euthymic patients (Arts et al., 2008). In general, greater neurocognitive impairment was associated with worse illness course (number of mood episodes, hospitalizations and length of illness) (Robinson and Ferrier, 2006). Previous studies have been predominantly in European and North American patient groups. This study extends the previous work on euthymic BD, to a group of Chinese BD-1 patients, seeks to establish if these impairments are also present in this group and how the illness courses are associated with these impairments.

2. Methods

This study was conducted in the Tuen Mun Mental Health Centre (TMMHC), a regional psychiatric outpatient clinic in Hong Kong. This study was approved by the Ethnic Committee of the New Territories West Cluster.

2.1. Participants

A list of all active outpatients with an *ICD-10* diagnosis of BD was generated from the local centralized computer register.

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Participants included had to be outpatients with present or prior history of a (mood disorder component) diagnosis of BD-1 Disorder based on the SCID. All participants were ethnic Chinese, aged 18–64 years, euthymic, with Cantonese as their first language. Participants were excluded if they were mentally incompetent to provide consent, mentally retarded, had a change in psychotropic medication during the past 4 weeks, current case or history of Diagnostic and Statistical Manual of Mental Disorder 4th Version (DSM-IV) alcohol or substance abuse (within the last 12 months), previous head injury with loss of consciousness, neurological disorder, any history of psychiatric illness (other than BD-1 disorder) or a significant physical health problem which might interfere with cognitive functioning.

Healthy control participants, matched for age, gender and race, were recruited within the nursing, occupational therapists and allied health staff (security guard, health care assistant, cleaner and clerk). They were confirmed as healthy by medical examination and the SCID to be free of neurological or psychiatric disorder. No control participants gave a history of having a first-degree relative with psychiatric disorder. Controls were excluded if they had a neurological or medical condition, recent history of substance or alcohol misuse. Written informed consent was obtained from all participants.

3. Measures

3.1. Central Nervous System Vital Signs (CNSVS)

The CNSVS is a computerized cognitive assessment battery for use in clinical research in psychiatric settings. Previous studies have administered the CNSVS to patients with BD. See Iverson et al. (2009) for detailed description of the CNSVS and the analyses. CNSVS is administered via a computer and takes approximately 30–40 min to complete.

3.2. Cognitive measures

CNSVS comprises of 7 common neuropsychological measures, including Verbal and Visual Memory Test, Finger Tapping Test (FTT), Symbol Digit Coding (SDC) Test, the Stroop Test (ST), a Shifting Attention Test (SAT) and a Continuous Performance Test (CPT). The battery generates 15 primary scores, which are used to calculate 7 domain scores (Memory, Psychomotor speed, Processing speed, Reaction time, Cognitive flexibility, Complex attention and Executive function) and a summary score (Neurocognition Index) (Iverson et al., 2009). Table 1 summaries how the domain scores were derived from the 7 neuropsychological measures.

The process of translation from English to Traditional Chinese was completed in 2005. The forward translation (English to Chinese) followed by a backward translation was performed by a different translation vendor. A comparison was performed to look for a discrepancy. A snapshot of results from several cultures and countries was analyzed in 2005 to verify the tests behaved cross-culturally. The conclusion is that they behave reliably across different cultures.

3.3. SCID – Chinese-bilingual version of Structured Clinical Interview for DSM-IV Axis I Disorders – Patient version (SCID-I/P)

The diagnosis of BD was based on the SCID (First et al., 2002). The Chinese-bilingual SCID-I/P has an inter-rater reliability of .91 for mood disorders and rater-clinician reliability of .84 for BD's and .76 for depression (So et al., 2003).

Table 1
Summary of the domain score and the test employed.

Neurocognitive Index	Test employed
Composite Memory	Correct responses of Verbal and Visual Memory Test
Verbal Memory	Correct responses of Verbal Memory Test
Visual Memory	Correct responses of Visual Memory Test
Psychomotor Speed	Finger Tapping Test and total correct responses of SDC
Reaction Time	Average 2 complex reaction time scores of ST
Complex Attention	Number of errors in CPT, SAT, ST (the lower the better)
Cognitive Flexibility	Correct responses of SAT minus the number of errors of SAT and ST
Processing Speed	Number of correct responses minus errors of SDC
Executive Function	Number of correct responses minus errors of SAT

3.4. Young Mania Rating Scale (YMRS)

YMRS was used to measure the severity of manic symptoms (Young et al., 1978). There are 11 items: elevated mood, increased motor activity energy, sexual interest, sleep, irritability, speech (rate and amount), language – thought disorder, content, disruptive–aggressive behaviour, appearance and insight.

3.5. Hamilton Rating Scale for Depression (HAM-D)

The HAM-D was used to measure the severity of depressive symptoms among persons diagnosed with depressive illness (Hamilton, 1960). The reliability of the HAM-D varies with conditions but is generally acceptable. Internal consistency as measured by Cronbach's alpha is from .48 to .92.

3.6. Beck Depression Inventory (BDI-II)

The BDI-II (Beck et al., 1996) is a widely used self-administered scale measuring symptoms of depression. BDI-II is positively correlated with the Hamilton Depression Rating Scale with a Pearson r of .71, showing good agreement. The test has also been shown to have a high 1-week test–retest reliability (Pearson r=.93).

3.7. Altman Mania Rating Scale (AMRS)

The AMRS is a 5-item self-rating scale, which was used to assess the presence and severity of manic symptoms. It is compatible with DSM-IV criteria, and it correlates significantly with Young Mania Rating Scale. It has a good specificity of 85.5% and good sensitivity of 87.3% for a cutoff score of 6 or higher indicating manic or hypomanic condition (Altman et al., 1997).

3.8. Wechsler Adult Intelligence Scale (WAIS) – 3-subtest short form

IQ of the participants was estimated using a 3-subtest short form (Similarities, Digit Span and Arithmetic) of the Chinese version of WAIS-R (Gong, 1992). This has been adapted cross-culturally and widely used in recent local studies (Lui et al., 2011a, 2011b).

3.9. Procedure

All participants completed 2 visits. Each visit took around one to one-and-a-half hours to complete.