Clinical and cognitive predictors of vocational outcome in first-episode schizophrenia: A prospective 3 year follow-up study

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ABSTRACT

Schizophrenia is associated with pronounced vocational impairment. Previous research has mostly focused on chronic patients and few studies were conducted to investigate predictors of work outcome in first-episode populations. The impact of cognitive dysfunction on employment outcome in early psychosis was under-studied. In this study, we prospectively followed up 93 patients aged 18–55 years presented with first-episode schizophrenia-spectrum disorder for 3 years with an aim to identify early clinical and cognitive predictors of vocational outcome. Pre-morbid adjustment, baseline symptomatology and cognitive functions, and employment outcome were assessed. Result indicated that approximately half of the patients (53.8%) were engaged in full-time work at intake and at 3 years. Pre-morbid adjustment, baseline occupational status and Wisconsin Card Sorting Test (WCST) performance were found to predict vocational outcome. Analysis on a subgroup of patients who were unemployed at intake showed that subjects who remained unemployed over 3 years had poorer WCST performance and more severe positive symptoms at baseline than those having job attainment during follow-up. Our results thus confirmed predictive value of pre-morbid functioning and baseline occupational status on vocational outcome. In addition, our findings suggested that executive function might be a critical cognitive determinant of employment outcome in the early course of schizophrenia.

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1. Introduction

Schizophrenia is a severe mental illness that constitutes one of the highest disease burdens globally (Whiteford et al., 2013). The disorder causes profound disruptions in individuals' functioning including independent living skills, social relationship, scholastic and occupational domains. In particular, substantial evidence indicated that a significant proportion of schizophrenia patients exhibited persistent vocational impairment. Literature consistently reported low employment rate in patients with schizophrenia and approximately half of the first-episode psychosis patients were already unemployed at initial presentation (Marwaha and Johnson, 2004; Killackey et al., 2006). It is recognized that unemployment was associated with worse symptomatic outcome, poorer quality of life, lower self-esteem, social exclusion and increased indirect costs of the illness (Bond et al., 2001; Knapp et al., 2004; Turner et al., 2009; Drake et al., 2013). Alternatively,

studies revealed that both patients and psychiatrists regarded job attainment as a key element signifying functional recovery (Tsang and Chen, 2007; Lam et al., 2011).

Previous research indicated that pre-morbid adjustment, work history, cognitive dysfunction, and socio-contextual factors such as discrimination and welfare policy predicted occupational status in schizophrenia (Marwaha and Johnson, 2004; Bond and Drake, 2008; Tsang et al., 2010; Giugiario et al., 2012). Nonetheless, the majority of these studies focused mainly on patients with chronic illness. Relatively few studies were conducted to examine the determinants of vocational outcome in the early stage of illness and most had follow-up duration of less than 2 years (Rinaldi et al., 2010). In addition, although cognitive impairment is a core feature of schizophrenia (Elvevag and Goldberg, 2000; Kahn and Keefe, 2013) and is associated with functional disability (Green et al., 2000), its impact on occupational functioning in early psychosis was the focus of only a limited number of investigations and the findings thus far were inconsistent (Rinaldi et al., 2010; Tandberg et al., 2011). Some studies showed that global cognitive deficit (Holtausen et al., 2007; Nuechterlein et al., 2011) or impairment in specific cognitive domains such as executive

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function (Jaeger and Douglas, 1992; Dickerson et al., 2008), attention (Milev et al., 2005; Tandberg et al., 2011), or verbal memory (Dickerson et al., 2007) predicted work outcome, while others failed to find such a relationship (Johnstone et al., 1990; Verdoux et al., 2002).

Given that the onset of schizophrenia most frequently occurs in late adolescence or early adulthood which are critical life stages for individuals' occupational development, identification of factors predictive of work functioning and provision of effective vocational interventions in the early course of illness may thus minimize social disability and improve long-term employment outcome. In this article, we report a prospective 3 year follow-up study in a cohort of Chinese patients presenting with first-episode schizophrenia-spectrum disorder with an aim to examine the employment rate and to identify pre-treatment and early clinical and cognitive predictors of vocational outcome.

2. Methods

2.1. Subjects and setting

One hundred and thirty-eight consecutive patients aged 18 to 55 years with first-episode schizophrenia, schizophreniform disorder or schizoaffective disorder were recruited from both outpatient and inpatient psychiatric units covering a defined catchment area in Hong Kong. Patients with known neurological disorder, learning disability or current substance abuse were excluded from the study. Of the initial cohort, 93 subjects completed the 3 year follow-up, 40 defaulted, four committed suicide and one died of medical disease. There were no significant differences between completers and non-completers in socio-demographics, duration of untreated psychosis, baseline symptom ratings and cognitive functions. Patients in this study were initially treated with low-dose first-generation antipsychotic medications. The current study was part of a prospective 3 year follow-up study in first-episode schizophrenia-spectrum disorder and findings regarding persistent negative symptoms, the impact of duration of untreated psychosis on illness outcome, and clinical and cognitive predictors of symptomatic remission have been reported elsewhere (Chang et al., 2011, 2013a, 2013c). The study was approved by local institutional review board and conducted in accordance with the Declaration of Helsinki. All of the subjects gave written informed consent before participation.

2.2. Assessments

Diagnostic assignment was based on longitudinal approach taking into consideration that diagnostic change may take place over time (Chang et al., 2009a, 2009b). The 3 year diagnosis of each subject was determined according to DSM-IV criteria (American Psychiatric Association, 1994) using all available information encompassing the whole follow-up period including the Chinese-bilingual Structured Clinical Interview for DSM-IV (CB-SCID-I/P) (So et al., 2003) administered at baseline and at 3 years, informant histories and medical records. Previous validation study showed that CB-SCID-I/P yielded reliable DSM-IV diagnoses in Chinese patients with psychotic disorders (So et al., 2003). Pre-morbid functioning was measured with the Pre-morbid Adjustment Scale (PAS) (Cannon-Spoor et al., 1982). We only included childhood (≤ 11 years) and early adolescence (12–15 years) periods for assessment to avoid any possible confounding with early symptoms because the onset of prodrome and psychosis usually occur in late adolescence and early adulthood (Cassidy et al., 2010; Chang et al., 2013b). The PAS total score was calculated by summing the scores on all items encompassing both childhood and early adolescence periods and dividing by the total possible score (score range 0–1, higher score indicates lower functioning). Interview for the Retrospective Assessment of the Onset of Schizophrenia (IRAOS) (Hafner et al., 1992) was used to confirm the first-episode status and to assess duration of untreated psychosis which was defined as the time interval between the onset of positive psychotic symptoms and treatment initiation.

Positive symptoms were assessed using Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987) with intra-class correlation coefficient (ICC) being 0.83 for positive symptoms subscale. High Royds Evaluation of Negativity Scale (HEN) (Mortimer et al., 1989) was employed to measure negative symptoms. It comprises six subscales and 18 items which are rated along an anchored five-point severity scale (range 0–4, higher score indicates more severe negative symptoms). Validation of HEN for use in Chinese schizophrenia patients has previously been reported (Chen et al., 1996). ICCs for the subscales ranged from 0.74 (Thought) to 0.85 (Speech). In this study, we only included four of the six subscales, i.e., Affect, Behavior, Speech and Functioning subscales for analysis (Chang et al., 2011) as the remaining two, namely Thought and Appearance

subscales were more related to disorganization dimension. Montgomery–Asberg Depression Scale (MADS) (Montgomery and Asberg, 1979) was used to assess depression. Vocational outcome was measured as the number of months in full-time employment, which was defined as full-time paid work or full-time study (Tandberg et al., 2012), over 3 year study period.

A brief battery of cognitive assessments was administered to all subjects, comprising logical memory test (Wechsler Memory Scale Revised, WMS-R-HK) (Hong Kong Psychological Society, 1989a), visual reproduction test (WMS-R-HK), forward digit span (Wechsler Adult Intelligence Scale, WAIS-R-HK) (Hong Kong Psychological Society, 1989b), category verbal fluency and Modified Wisconsin Card Sorting Test (MWCST) (Nelson, 1976). General verbal intelligence was estimated at baseline using information subscale from the WAIS-R-HK (Chen et al., 2005).

Psychopathological evaluation was conducted for each subject at intake and after clinical stabilization of the first psychotic episode (mean=42.6 days after initial assessment). To maximize cooperation and to reduce state effects of acute psychosis, cognitive assessment undertaken when patients were clinically stabilized was regarded as baseline cognitive measure. A group of healthy controls, matched with age, sex and educational level, were recruited via advertisements and were evaluated with the same battery of cognitive assessments as patients at baseline for comparison of cognitive performance.

2.3. Statistical analysis

Patients were categorized into two groups based on the median split of the length of full-time employment over 3 years. Patients with good outcome achieved full-time employment of more than 8 months, while those with poor outcome were employed for 8 months or less. In this study, we focused on identifying pre-treatment as well as early clinical (at baseline and clinical stabilization) and cognitive (at clinical stabilization) predictors of vocational outcome. Group differences with regard to pre-morbid adjustment, socio-demographics, baseline clinical and cognitive measures, and treatment characteristics were analyzed using chi-square test and independent t-test as appropriate. Those pre-morbid and baseline variables that were found to be statistically significant in bivariate analyses were then entered into a backward stepwise binary logistic regression model (Wald statistics) to determine which factors independently predicted employment outcome. In an attempt to explore early clinical and cognitive determinants of full-time employment acquisition during follow-up in a subgroup of patients who were unemployed at intake, we conducted comparative analyses between subjects who remained unemployed over 3 years since initial presentation (unemployed group) and those who had ever attained full-time work within the study period (employed group) in pre-treatment and baseline variables, followed by binary logistic regression analysis. Duration of untreated psychosis was log-transformed due to its skewed distribution. Standardized z scores for cognitive functions were computed for analyses based on performance of healthy controls, with a mean score of 0 and standard deviation of 1. The level of statistical significance for all analyses was set at $p < 0.05$.

3. Results

3.1. Characteristics and employment status of the sample

The 93 subjects were predominantly single (74.2%) and 45.2% were male. The mean age of the sample at intake was 31.2 years (S.D.=9.6) and the average educational level was 10.54 years (S.D.=2.9). The median duration of untreated psychosis of the sample was 180 days (mean=473.7, S.D.=786.4). Diagnoses for the cohort were schizophrenia (n=75), schizophreniform disorder (n=13) and schizoaffective disorder (n=5). Full-time employment rate at intake as well as at the end of 3 year follow-up was 53.8% (n=50). Of the 43 subjects who were not working at intake, 53.3% (n=23) remained unemployed over 3 years. The median length of full-time employment of the sample over 3 year follow-up was 8 months (mean=13.6, S.D.=14.6, range 0–36).

The control sample comprised 114 subjects with 41.2% being male. The mean age and educational level of the control group were 33.4 years (S.D.=10.0) and 11.1 years (S.D.=2.2), respectively. There were no significant differences between patients and healthy controls in age, sex and educational level (see Table S1). Patients performed significantly worse than controls in all cognitive tests with a range from 0.4 (forward digit span) to 1.0 (logical memory, delayed recall) standard deviations below those of controls with the exception of visual reproduction test which