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Patterns and predictors of trajectories for social and occupational functioning in patients presenting with first-episode non-affective psychosis: A three-year follow-up study

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ABSTRACT

Background: Functional impairment is prevalent in patients with first-episode psychosis (FEP). Longitudinal course of functioning in the early stage of psychotic illness is under-studied. In this report, we aimed to investigate the patterns and baseline predictors of social-occupational functional trajectories over 3 years, utilizing growth mixture modeling (GMM) analysis, in a large representative Chinese young FEP cohort in Hong Kong.
Method: Six hundred seventeen consecutive patients aged 15–25 years presenting with first-episode non-affective psychosis to a specialized early intervention service were studied. Data on demographic, pre-treatment and baseline clinical characteristics were collected. Individual class membership of functioning derived from GMM was based on ratings on Social and Occupational Functioning Scale (SOFAS) measured at five different time-points (baseline, 6, 12, 24 and 36 months) across 3-year follow-up.
Results: Four distinct functional trajectories were identified including persistently poor (48.1%, $n = 320$), early improved (31.3%, $n = 203$), gradually improved (14.8%, $n = 69$) and improved-deteriorated (5.8%, $n = 25$) trajectories. Multinomial regression analysis revealed that male gender, lower educational attainment, a diagnosis of schizophrenia-spectrum disorder and a receipt of inpatient treatment upon initial presentation independently predicted persistently poor trajectory membership.
Conclusion: The current study reveals a heterogeneous course of social-occupational functioning in FEP. Our finding that approximately half of the patients displaying persistently poor trajectory over 3 years indicates functional impairment as an unmet therapeutic need in early illness phase. Further research applying individual-based trajectory analysis in FEP is warranted to facilitate better characterization of longitudinal patterns of functioning and development of targeted intervention to promote early recovery.

1. Introduction

Psychotic disorders typically emerge in late adolescence or early adulthood, and affect approximately 2.5–3% of the population (Perälä et al., 2007; Chang et al., 2017a). The disorders are associated with prominent social and occupational functional impairment, and constitute as one of the leading causes of disability worldwide (Global Burden of Disease Study 2013 Collaborators, 2015). Although provision of specialized early intervention service effectively improve functional outcome in patients with first-episode psychosis (FEP) (Harvey et al., 2007; Bird et al., 2010), substantial evidence has shown that a significant proportion of FEP patients exhibit functional disability even in the presence of symptom remission (Wunderink et al., 2009; Chang et al., 2012; Verma et al., 2012). Functional impairment thus represents an unmet therapeutic need in the early stage of psychotic illness.

Previous longitudinal research examining prediction of functional outcome in FEP and schizophrenia samples mostly defined an "outcome" as either a dichotomized variable (e.g. functional remission or recovery status) based on a priori determined threshold indicating adequate functioning maintained within a specified duration or a continuous variable of functional levels (as group averages for analysis) measured from a single assessment conducted at the end-point of the follow-up period. These conventional outcome-analysis approaches, however, are hampered by several methodological constraints including not taking into consideration the course or change of functional levels across the entire study period and masking the complexity of individual variation in functioning over time. To address these limitations, recently, an individual-based longitudinal modeling, namely growth

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mixture modeling (GMM) has been increasingly applied in mental health research. GMM is a model-based statistical approach which allows for probabilistic classification of subjects into discrete subgroups based on their longitudinal trajectories (Ram and Grimm, 2009). Despite its methodological advantages, very few studies have been conducted to examine the longitudinal course of functioning in patients with psychotic disorders using this individual-based trajectory analysis. Until now, there are only two published reports on FEP samples in this respect. One recent study investigated social functional trajectories of FEP patients over 1-year period and found that male gender, younger age at onset of psychosis, more severe negative symptoms at baseline and poorer premorbid adjustment predicted poor recovery trajectory (Hodgekins et al., 2015). Another study examined 20-year longitudinal trajectories of functioning in first-admission psychosis patients and demonstrated substantial variability of social functional outcomes in study sample across follow-up (Velthorst et al., 2017).

To better understand the patterns and predictors of social-occupational functional trajectories, particularly in the early stage of illness, is crucial to early identification of patients at high-risk for persistent functional disability and provision of targeted intervention to promote early recovery. Given the heterogeneous course of illness, alongside a paucity of data regarding functional trajectories in FEP populations in the initial years of treatment, we aimed to (1) identify distinct trajectories of functioning, based on the ratings on Social and Occupational Functioning Scale (SOFAS; Goldman et al., 1992), over 3-year follow-up using GMM analysis, and (2) to investigate baseline predictors discriminating between trajectory membership in a large representative cohort of Chinese young people presenting with first-episode non-affective psychosis to a specialized early intervention service in Hong Kong.

2. Method

2.1. Subjects and setting

The current report was part of a large-scale FEP outcome study (e.g. Chang et al., 2012, 2015a; Chan et al., 2014) comprising 700 patients consecutively enrolled in the Early Assessment Service for Young People with Psychosis (EASY). Briefly, EASY was a publicly-funded specialized program providing early assessment and phase-specific intervention to all individuals aged 15 to 25 years presenting with FEP in Hong Kong (Chung and Chen, 2013). The program consisted of five treatment teams covering the whole territory of Hong Kong with a population of approximately seven million and over 95% of the population being Han Chinese. The service adopted a case-management approach and assertively followed up patients for the first 3 years after their initial episode (including follow-up in a transitional step-down clinic in year 3). Clinical information regarding the onset and development of psychosis, symptom profiles, risk behaviors and psychosocial functioning were systematically evaluated on each patient. Multi-disciplinary case reviews were held regularly for close monitoring of each patient's clinical progress and treatment outcome. Patients were discharged to generic psychiatric services at the end of the program.

In this study, we excluded patients who had mental retardation, psychotic disorders due to general medical condition, substance-induced psychosis or received psychiatric treatment for >1 month before service entry. Of the original cohort, 617 patients who were diagnosed to have schizophrenia, schizoaffective disorder, acute and transient psychotic disorders or unspecified nonorganic psychosis based on ICD-10 criteria (World Health Organization, 1992) were retained as the study sample for current investigation of patterns and predictors of functional trajectories over 3-year follow-up. The study was approved by the local research and ethics committee.

2.2. Assessments and procedure

Subjects' baseline and follow-up variables were obtained via systematic record review. For each subject, outpatient and inpatient medical records, and computerized clinical information from medical database were retrieved. Trained research assistants acquired the data from medical files according to a protocol designed specifically for data collection in the current study. Standardized data entry forms were used to systematically extract intake, treatment and follow-up variables from consecutive medical files. Weekly consensus meetings were held throughout the period of data collection to ensure strict adherence to protocol and to resolve ambiguity in clinical information during data acquisition process. Only the data that could be reliably extracted from records were targeted for retrieval and analysis. Follow-up characteristics and outcome measures were determined for each month spanning over 3 years following the first contact to treatment. Validity and inter-reliability for major variables including duration of untreated psychosis (DUP), symptom and functional measures were evaluated using intra-class correlation coefficient (ICC). Validity compared ratings between an experienced psychiatrist and research staff (ranging from 0.78 to 1.00). Inter-rater reliability compared ratings between research staff (ranging from 0.70 to 1.00). Both validity and inter-rater reliability exercises yielded satisfactory levels of concordance.

Demographic data included gender, age at service entry and educational level. Pre-treatment illness characteristics included history of suicide attempt and substance abuse before enrolment to EASY. Baseline clinical characteristics included age and mode of onset of first psychotic episode, and DUP which was defined as the time interval between onset of positive psychotic symptoms and first contact with psychiatric service. Acute onset was defined as the development of a psychotic episode from the first noticeable behavioral change occurring within one month. The final 3-year ICD10 diagnosis, which took into consideration the longitudinal course of illness (Chang et al., 2009), was ascertained as subject's research diagnosis. Following the method used by previous research (Conus et al., 2007; Haro et al., 2011), severity of positive and negative symptoms at entry was assessed using Clinical Global Impression – Severity of Illness Scale (CGI-S; Guy, 1976). Baseline depressive symptoms were evaluated using the depression score of CGI-S: Bipolar Illness (CGI-BP; Spearing et al., 1997). Functional levels were measured by SOFAS.

2.3. Statistical analysis

We employed growth mixture modeling (GMM) to identify distinct trajectories of patients' social-occupational functioning over 3-year follow-up. GMM is a person-centered statistical approach used to delineate homogenous subgroups (latent classes) of individuals with similar patterns of change over time (Ram and Grimm, 2009). In the current analysis, individual class membership was assigned on the basis of SOFAS scores measured at five time-points over 3 years, i.e., at intake, 6, 12, 24 and 36 months, utilizing full-information maximum likelihood estimation to account for missing data with the assumption that data were missing at random (Little and Rubin, 2002). To determine the optimal number of trajectory classes, models with increasing number of latent classes (from 1 to 5-class models) were fitted to the data and the best-fitting model was selected according to the following goodness-of-fit indices: Akaike's Information Criterion (AIC), Bayesian Information Criterion (BIC), samples-size-adjusted BIC (aBIC) and Boostrap Likelihood Ratio Test (BLRT). Lower values of AIC, BIC and aBIC suggest a more parsimonious model, while a significant BLRT (based on p value) indicates that this model (e.g. a K class model) has a better fit than a model with one fewer latent classes (i.e., a K-1 class model). Aside from fit statistics, interpretability was also taken into consideration in model selection. GMM analyses were performed on Mplus, version 7 (Muthén and Muthén, 2017).

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