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First-episode psychosis and vocational outcomes: A predictive model

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ABSTRACT

Most studies on predictors of vocational outcomes are cross-sectional and results are varied. This study aimed to examine the vocational rates of patients with first-episode psychosis (FEP), identify factors predicting a lack of engagement in age-appropriate roles, and evaluate the predictive ability of a model with baseline sociodemographic information and 2-year symptom and functioning trajectories on vocational outcomes. The Singapore Early Psychosis Intervention Program (EPIP) has maintained a standing database on patient clinico-demographic information. The primary outcome, vocational status, was operationalized as "meaningfully employed", that is, being gainfully employed or engaged in an age-appropriate role, and "unemployed". Using logistic regression, the predictive ability of the proposed model was evaluated. Vocational data was available for 1177 patients accepted into EPIP between 2001 and 2012. At the end of two years in the service, 829 (70.4%) patients were meaningfully employed and 348 (29.6%) patients were unemployed. The binary logistic regression model on the prediction of 2-year vocational outcomes yielded an AUC of 0.759 (SE = 0.016, p-value < 0.001). Clinico-demographic risk factors for being unemployed at the end of two years included being Malay, single, and unemployed at baseline; having a longer duration of untreated psychosis (DUP); a diagnosis of schizophrenia, schizophreniform, or delusional disorder at baseline; and belonging to the 'delayed response' or 'slower response and no response' general psychopathology trajectories. We have proposed a model that allows vocational outcomes to be predicted with high specificity. The results of this study will be relevant in developing future intervention models to improve outcomes among FEP patients with different illness trajectories.

1. Introduction

Most psychotic disorders first occur in the early twenties, at a developmentally crucial time where many begin the transition from education to employment (Kessler et al., 2007; Rinaldi et al., 2010). Being able to engage in an age-appropriate vocational role, despite the debilitating impact of the illness, brings about a sense of purpose and stability at a particularly challenging time in a person's life. Sustaining gainful employment is important in the recovery process, having been shown to increase well-being by contributing to outcomes such as symptom improvement and self-esteem (Bond et al., 2001; Reneflot and Evensen, 2014). Several meta-analyses have also indicated that unemployment may be a causal factor of distress and psychological and physical health problems (McKee-Ryan et al., 2005; Paul and Moser, 2009). Given the benefits of returning to education or employment, and correspondingly functional recovery, being engaged in an age-appropriate academic or vocational role is understandably often highlighted as a desired intervention outcome (Iyer et al., 2011). However, despite best efforts, it is evident in clinical practice that these functional outcomes are often difficult to attain, especially without appropriately individualized and targeted interventions, given the diverse needs and characteristics of patients with psychotic disorders.

Despite the abundance of studies on predictors of vocational outcomes, most methodologies are cross-sectional in nature and results are not consistently significant across different studies. This underscores a lack of understanding and consensus on how one can predict and increase rates of functional recovery in patients with psychosis. While it is known that certain patient sociodemographic and clinical factors are predictors of vocational outcomes and mental well-being, the mechanisms behind these relationships are not clearly understood. For example, unemployment rates have been found to be markedly higher in patients with first-episode psychosis (FEP) as compared to the general population, with age and global functioning the only independent significant predictors after accounting for duration of untreated psychosis (DUP), educational level, and negative symptom severity (Ramsay et al., 2012). However, other literature has shown that sociodemographic and clinical factors have lesser impact on the

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relationship between mental health and employment, as compared to cognitive factors such as appraisals; coping abilities; and the types of intervention provided (Bond and Drake, 2008; McKee-Ryan et al., 2005; Rinaldi et al., 2010).

Differences in methodologies aside, one reason for such inconsistent findings could be explained by the heterogeneous nature of illness trajectories in psychotic disorders. The recent interest in research on the longitudinal course of schizophrenia has led to evidence for distinct symptom profiles of the disorder (Bota and Preda, 2011; Millan et al., 2016; Reichenberg et al., 2005). Using latent class growth analysis (LCGA), a local study by Abdin et al. (2017) found distinct symptom severity and functioning trajectories, operationalized by Positive and Negative Syndrome Scale (PANSS) and Global Assessment of Functioning (GAF) scores respectively across two years. The identified poorer PANSS trajectories were significantly associated with the poorest GAF trajectory, and were predicted by clinical and sociodemographic baseline factors. It is now timely to examine the implications of these illness trajectories on vocational outcomes at the end of two years of active intervention in a specialized early psychosis intervention service.

This study aimed to firstly, provide an estimate of vocational rates in patients with FEP at the end of two years of intervention; secondly, identify factors predicting a lack of engagement in age-appropriate roles; thirdly, evaluate the predictive ability of a model with baseline sociodemographic information and 2-year symptom and functioning trajectories on vocational outcomes; and lastly, as a form of comparison, evaluate the predictive ability of a model with baseline sociodemographic information and baseline clinical factors (single-point PANSS and GAF scores) on vocational outcomes. As it is inherent that a model with trajectories would encapsulate more information than one with only baseline data, it is hypothesized that the former would be a better fit to predict return to education and employment. The results of this study will be relevant in developing and tailoring future intervention models to improve functional outcomes among FEP patients with different illness trajectories.

2. Methods

The Early Psychosis Intervention Program (EPIP) is a nationwide program based at the Institute of Mental Health (IMH), the only state psychiatric hospital in Singapore. Patients accepted into the program fulfilled the following criteria: (a) age between 16 and 40 years old inclusive, (b) first-episode psychotic disorder with no prior or minimal treatment, and (c) psychotic disorder that is not secondary to a general medical condition or substance use. Psychotic Disorder is defined as meeting the Diagnostic and Statistical Manual of Mental Disorders IV-TR (DSM-IV-TR) (American Psychiatric Association, 2000) criteria for schizophrenia, schizophreniform disorder, schizoaffective disorder, delusional disorder, brief psychotic disorder, psychotic disorder not otherwise specified, or mood disorders with psychotic features. Intensive intervention from a multidisciplinary team of psychiatrists, case managers, occupational therapists, nurses, social workers, psychologists, and peer support specialists is provided to all patients for at least two years.

Using the international consensus statement by Bertolote and McGorry (2005) for early intervention and recovery for early psychosis as benchmark guidelines, the service has consistently maintained an assessment system and database to monitor patient outcomes. The EPIP database is an on-going registry that has been registered with the Singapore National Healthcare Group (NHG) as a free standing database. Clinico-demographic data is captured prospectively, and data integrity is maintained by stringent and regular quality checks. The rating scales employed at fixed time points (baseline, 3, 6, 12, and 24 months) in the service include the PANSS and GAF. These are completed by EPIP psychiatrists, who have undergone training in the use of these instruments and sessions to establish inter-rater reliability (0.94 in this sample) and minimize inter-rater drift. Each patient's diagnosis according to the DSM-IV-TR and DUP (operationalized as the number of months since the onset of symptoms before treatment), and other sociodemographic information, such as age, gender, ethnicity, marital status, educational level, and vocational status, is also recorded by the treating psychiatrist and assigned case manager respectively at baseline contact. The outcome of interest, vocational status, options for which include meaningfully employed (gainful employment or engagement in an age-appropriate role) and unemployed, is also recorded by the assigned case manager, who follows up closely with the patient's psychosocial progress, at baseline and at the end of two years in the program. An age-appropriate role is defined to include homemaker, youth actively involved in public or private school and, in the case of Singaporean males above 18 years of age, enlistment in compulsory military service. Participants had to be actively involved in these roles for the preceding three months to qualify as meaningfully engaged at the time of assessment.

The classification of subjects into symptom and functioning trajectory groups using LCGA was provided by Abdin et al.'s (2017) original paper. In their study, two discrete trajectories were identified for positive symptoms – 'early response and stable' (early reduction in symptoms followed by maintenance of low-level symptom severity) and 'delayed response' (initial response to treatment followed by steady reduction in symptoms). Four discrete trajectories were identified for both negative and general psychopathology symptoms – 'early response and stable', 'early response and relapse' (early reduction of symptoms followed by relapse), 'delayed response', and 'slower response and no response' (early response to treatment followed by no response). For functioning, three distinct trajectories were identified – 'high functioning' (significant improvement over time), 'moderately stable functioning' (initial response to treatment followed by maintenance), and 'deterioration in functioning' (minimal improvement followed by significant decline).

In our naturalistic study, all EPIP patients accepted into the program during the period of 2001 to 2012 were included. Ethical approval for conducting the study was received from the National Healthcare Group's Domain Specific Review Board (DSRB Reference Number: 2016/00017).

Statistical analyses were conducted using IBM Statistical Package for Social Sciences (SPSS) 23. Mean and standard deviations were computed for continuous variables, and frequencies and percentages were computed for categorical variables. Chi-square and *t*-tests were conducted to examine differences between the meaningfully employed and unemployed groups at the end of two years, and the resulting *p*-values included in the table. Using multiple logistic regressions, the predictive ability of a model with baseline sociodemographic and clinical characteristics on vocational outcomes, and a model with baseline sociodemographic characteristics and 2-year symptom and functioning trajectories on vocational outcomes, were evaluated by their classification accuracy as expressed by the area under the receiver operating characteristics curve (AUC). Multinomial logistic regression was performed to predict the change in vocational status over the two years in the service. Statistical significance for this study was established at p-value < 0.05.

3. Results

A total of 1724 EPIP patients were accepted into the program between 2001 and 2012. Vocational outcome data at the end of their two years in the service was unavailable for 547 (31.7%) patients. As compared to those with known vocational status at the end of two years, those with unavailable data were more likely to be male; married (vs. single); and have either brief psychotic disorder or psychotic disorder not otherwise specified (vs. schizophrenia spectrum and delusional disorder). Among the 547 whose data was unavailable, 274 (50.1%) were missing, 234 (42.8%) were discharged from the service early either because they were seeking psychiatric services from elsewhere (local or