**Long-term employment among people at ultra-high risk for psychosis**

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**Abstract**

**Background**

Psychotic disorders are associated with high rates of sustained unemployment, however, little is known about the long-term employment outcome of people at ultra-high risk (UHR) of developing psychosis. We sought to investigate the long-term unemployment rate and baseline predictors of employment status at follow-up in a large UHR cohort.

**Method**

268 UHR patients recruited from the Personal Assessment and Crisis Evaluation clinic in Melbourne, Australia were followed-up over 2-14 years after initial presentation to the service. Individuals in no form of employment or education were classed as unemployed. Logistic regression analyses were used to examine predictors of employment outcome.

**Results**

A high rate of unemployment was present at follow-up in this UHR sample (23%). At baseline, those who were unemployed at follow-up had a longer duration of untreated illness, more severe negative symptoms, lower IQ, poorer social and occupational functioning and reported more childhood trauma than the employed group. At follow-up, unemployed individuals exhibited significantly more severe symptoms on all measures and were more likely to have been diagnosed with a mood, anxiety, psychotic or substance use disorder. Childhood trauma and the duration of untreated illness at baseline were significant independent predictors of employment status at follow-up in the multivariate analyses.

**Conclusions**

Nearly a quarter of this UHR sample were unemployed at long-term follow-up. The duration of untreated illness and the effects of childhood trauma are potentially modifiable risk factors for long-term employment outcome in this group. Vocational support may be beneficial for many UHR patients presenting to services.

**Keywords:** At-risk mental state; Employment; Functioning; Psychosis; Ultra-high risk

**1. Introduction**

Psychotic disorders such as schizophrenia are associated with high rates of sustained unemployment (Marwaha and Johnson, 2004; Marwaha et al., 2007; Waghorn et al., 2012). In an effort to reduce this, there is a growing international consensus that vocational support should be offered for these patients (Kreyenbuhl et al., 2010; National Institute for Health and Care Excellence, 2014; Galletly et al., 2016). In England, mental health services are now required to assist patients with first-episode psychosis to engage in employment, education or training as part of the new ‘Early Intervention in Psychosis Access and Waiting Time standards’ (NHS England, 2016). As well as reducing the high societal cost of these disorders (Knapp et al., 2004), employment is thought to improve the general wellbeing of people with psychosis and is widely considered to be an important aspect of recovery (Rinaldi et al., 2010; Ramsay et al., 2011).

In contrast, little is known about the long-term employment outcome of young people who are at ultra-high risk (UHR) of developing a psychotic disorder (Yung et al., 1996, 1998; Fusar-Poli et al., 2013a). This is a group for whom similar provision of resources may be important. At presentation to services, UHR patients are significantly more likely to be unemployed compared to their peers (Fusar-Poli et al., 2010), with reports suggesting up to 46% are not in employment, education or training (Fusar-Poli et al., 2013b). However, data on employment outcome in this population is limited to only a few short-term follow-up studies (Velthorst et al., 2011; Salokangas et al., 2013). To our knowledge, no studies have examined the long-term unemployment rate or baseline predictors of employment outcome in the UHR group.

The aims of the current study were;

1. To examine the rate of unemployment among a large UHR cohort at long-term follow-up
2. To determine which clinical and demographic baseline variables were the strongest predictors of employment status at follow-up

**2. Method**

**2.1. Participants**

The current data are part of a longitudinal study that aimed to reassess all UHR individuals who took part in research at the PACE (Personal Assessment and Crisis Evaluation) clinic in Melbourne, Australia between 1993 and 2006 (*n* = 416). At baseline, participants were aged 15-30 years and met UHR criteria rated according to the Comprehensive Assessment of At-Risk Mental States (CAARMS; Yung et al., 2005). Follow-up assessments were conducted between 2007-2009. The full sample has been described in detail elsewhere (Nelson et al., 2013). This study reports data from 268 patients who underwent face-to-face interview at follow-up and completed a comprehensive battery of clinical and demographic measures. Follow-up assessments were conducted between 2.39 and 14.87 years (mean = 7.43; *SD* = 3.27) after identification as UHR. The study was approved by the local research ethics committee. All participants provided written informed consent.

**2.2. Procedure and assessments**

The primary outcome was occupational status at follow-up, which was assessed at the follow-up interview. All demographic and clinical symptom measures were conducted at baseline and follow-up. The total CAARMS positive symptom score was calculated by combining scores from the following subscales: disorders of thought content, perceptual abnormalities, conceptual disorganisation and motor disturbances. The CAARMS negative symptom score was calculated by combining the following subscales and basic symptom items: disorders of concentration, attention and memory, disorders of emotion and affect, subjectively impaired energy and impaired tolerance to normal stress (Yung et al., 2005). Positive psychotic symptoms were also assessed using the Brief Psychiatric Rating Scale (BPRS; Overall and Gorham, 1962) psychotic subscale. Negative symptoms were assessed using the Scale for the Assessment of Negative Symptoms (SANS; Andreasen, 1984). Depression and anxiety were measured with the Hamilton Rating Scale for Depression (HAM-D) and Hamilton Rating Scale for Anxiety (HAM-A), respectively. UHR criteria and duration of untreated illness (DUI) were recorded at baseline using the CAARMS. DUI was calculated based on the duration between the first noted change from premorbid state, determined using all available information (self-report and informant report), and date of acceptance into the PACE clinic, as described and operationalised in the CAARMS instrument (Yung et al., 2005). Social and occupational functioning both at baseline and follow-up were assessed using the ‘interpersonal relations’ and ‘instrumental role’ subscales of the Quality of Life Scale (QLS; Heinrichs et al., 1984). IQ was assessed at baseline and follow-up using a variety of validated measures previously described in detail elsewhere (Lin et al., 2011). History of childhood maltreatment was assessed using the brief Childhood Trauma Questionnaire (CTQ; Bernstein et al., 2003).

Transition status was defined as the development of full threshold psychotic disorder at any time over the follow-up period. Mood, anxiety and substance use disorders were also assessed at baseline and follow-up using the Structured Clinical Interview for DSM-IV (SCID).

**2.3. Data analysis**

All analyses were performed using SPSS statistical software (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp). Two employment outcome groups were created. The ‘Employed’ group comprised those individuals who were in paid employment (full- or part-time) and/or were students (many of whom were also employed) at the follow-up assessment. If an individual was not in any form of employment, education or training then they were classed as ‘Unemployed’. Those who identified as ‘homemakers’ (e.g. parents or carers) were not included in the analyses. Group differences in clinical and demographic variables were assessed at baseline and follow-up. Continuous and categorical variables were examined using independent samples *t*-tests and chi-square tests respectively.

Hierarchical logistic regression models were used to examine predictors of employment status at follow-up. Baseline variables that differed between the two groups (*p* < .20) were included as predictors. Information on employment status at baseline was only available for a subset (58.5%) of patients. We therefore performed two sets of analyses, one using all patients with employment data at follow-up (*n* = 246) and another in the subset with employment data at both baseline and follow-up (*n* = 144). Baseline QLS occupational functioning scores were used as a proxy for baseline employment in the main analyses. The point-biserial correlation coefficient between these variables in the subsample of patients with both measures was strong (*rpb* = .67). Variables were entered into the multivariate analyses in the following blocks: (1) sex, age and IQ at baseline, history of childhood trauma; (2) symptoms at baseline; (3) functioning at baseline; (4) follow-up duration and transition status at follow-up. We also re-ran the final block including a variable indicating the presence of any psychiatric diagnosis at follow-up (instead of only transition to psychosis) to examine whether this had an impact on the multivariate model. Bivariate correlations were computed to examine collinearity between baseline variables prior to their inclusion. Model fit was assessed using the Nagelkerke *R*2 statistic.

**3. Results**

**3.1. Employment rate**

At follow-up, 92 individuals (34.3%) were in full-time employment, 58 (21.6%) were employed part-time or as casual workers, 34 (12.7%) were students, 22 (8.2%) identified as homemakers and 62 (23.1%) were unemployed.

**3.2. Group differences at baseline and follow-up**

Group differences at baseline and follow-up between those categorised as ‘Employed’ (*n* = 184) or ‘Unemployed’ (*n* = 62) at follow-up are provided in Table 1. At baseline, those who were unemployed at follow-up had a longer DUI, more severe negative symptoms, lower IQ, and reported more childhood trauma than the employed group. Those who were unemployed at follow-up also had significantly poorer social and occupational functioning at baseline. However, age, depression, anxiety, level of education and the proportion of males were similar in both groups. There were also no group differences at baseline in the proportion of participants who had been diagnosed with an anxiety, mood or substance use disorder.

Among those patients with baseline employment status data; 22 of 113 (19.5%) who were employed at follow-up and 12 of 31 (38.7%) who were unemployed at follow-up were unemployed at baseline (χ2 = 4.993, df = 1, *p* = .025).

**[Insert Table 1 here]**

Over the follow-up period, 69 participants (25.7% of the sample) developed a full-threshold psychotic disorder. A significantly higher proportion of participants in the unemployed group had developed a psychotic disorder compared to the employed group. At follow-up, unemployed individuals exhibited significantly more severe symptomatology on all measures and higher rates of anxiety, mood and substance use disorders.

**3.3. Predictors of employment status**

Correlations between baseline predictor variables included in the multivariate analyses were weak, with the exception of the associations between the SANS score and both the QLS social (*r* = -.57) and occupational (*r* = -.50) functioning subscales. However, the SANS was added in the block prior to the functioning assessment scores and was not a significant predictor in any of the multivariate models. The final model from the multivariate analyses is presented in Table 2. CTQ scores and DUI at baseline were significant independent predictors of employment status at follow-up. After including these variables in the model, the addition of other variables in the multivariate analyses had little impact on the odds ratios of the CTQ and DUI variables (details of each of the models in the hierarchical analyses are presented in Supplementary Table 1). The final model accounted for 19% of the variance in employment status at follow-up (Nagelkerke *R*2 = .194). Transition status (i.e. whether or not individuals had developed psychosis) at follow-up was not a significant independent predictor of employment outcome. Social functioning at baseline was the only other significant predictor of employment status in the earlier multivariate models. This association became non-significant following the inclusion of transition status and the length of follow-up in the subsequent block. Inclusion of a variable indicating the presence of any psychiatric diagnosis at follow-up (as opposed to only psychotic disorder) also had a negligible impact on the odds ratios of the other predictor variables and was not a significant predictor in the multivariate model.

**[Insert Table 2 here]**

Among the subsample of UHR individuals with employment data at both time points, CTQ scores and social functioning at baseline were the only significant independent predictors of employment outcome in any of the hierarchical models. Unemployment at baseline was not predictive of employment status at follow-up when included at any stage of the multivariate analyses.

**4. Discussion**

**4.1. Summary of results**

Almost a quarter of UHR participants recruited and followed-up from the PACE clinic were unemployed on average seven years after presenting to the service. Although this is a much lower figure compared to the unemployment rate reported among individuals with full-threshold psychotic disorders both in Australia and internationally (Marwaha et al., 2007; Waghorn et al., 2012), it is still a considerable proportion of young people and represents a potential target for intervention. Childhood trauma and longer DUI were significant independent predictors of employment status at follow-up in the multivariate analyses.

**4.2. Clinical implications**

These findings add to the growing literature that poor functional and mental health outcomes occur in many UHR individuals regardless of long-term transition status (Addington et al., 2011; Brandizzi et al., 2015; Lin et al., 2011, 2015; Yung et al., 2015). Those UHR individuals who were unemployed exhibited more severe symptoms across all measures at the follow-up assessment and were more likely to have been diagnosed with a psychotic, mood, anxiety or substance use disorder. Psychiatric disorders are a common reason for unemployment, with inability to work due to mental health problems among the leading reasons for individuals claiming disability benefits (Viola and Moncrieff, 2016). However, employment may also confer some modest clinical benefits. For example, there is evidence that employment is associated with improvements in symptoms and quality of life in patients with schizophrenia (Marwaha and Johnson, 2004).

The provision of support to facilitate vocational recovery among patients with psychotic disorders has been identified as an important aspect of clinical intervention in a number of countries (Kreyenbuhl et al., 2010; Galletly et al., 2016; NHS England, 2016). Such approaches have been shown to be effective for improving vocational outcome among young people experiencing a first-episode of psychosis (Killackey et al., 2008; Bond et al., 2015). Our findings in this UHR cohort suggest these recommendations should be extended to the UHR group.

Childhood trauma has previously been associated with impaired vocational functioning in a range of psychiatric disorders (Cotter et al., 2015a). Exposure to childhood trauma is common among UHR individuals (Kraan et al., 2015a), although evidence linking it to increased risk of transition to psychotic disorder in this group remains inconclusive (Thompson et al., 2014; Kraan et al., 2015b; Stowkowy et al., 2016). Poor engagement with clinical services, more severe psychiatric symptoms and cognitive impairment have all been linked to childhood trauma in patients with psychosis (Aas et al., 2014; Gumley et al., 2014). Post-traumatic stress disorder (PTSD) may also be a comorbid problem among those individuals exposed to trauma, which in turn is associated with poorer employment outcomes among individuals with serious mental illness (Mueser et al., 2004a; 2004b). In the UHR group, childhood trauma is predictive of persistent attenuated symptoms, and is associated with more severe depressive and general symptoms (Kraan et al., 2015b). Collectively, these factors may mediate its association with unemployment. In addition, individuals who have experienced childhood trauma are at increased risk of revictimization (Cotter et al., 2016a; Ports et al., 2016), which in turn may affect factors relating to their ability to maintain employment. These findings further emphasise the importance of assessing childhood trauma in the clinical setting in order to identify those individuals at elevated risk of poor outcome (Yung et al., 2015).

DUI was also a significant independent predictor of long-term employment outcome. It is not clear if this is an effect of delayed treatment or if there are common factors that increase risk for long DUI and for unemployment. The same issue is debated in relation to first-episode psychosis and the association between long duration of untreated psychosis (DUP) and poor functional outcome (Hill et al., 2012; Cotter et al., 2016b). For example, poor insight, social isolation, negative symptoms and insidious onset contribute to long DUP and may also contribute to poor functioning (Barnes et al., 2000; Drake et al., 2000; Boonstra et al., 2012; Chang et al., 2012). However, it appears that long DUP still has an independent effect on outcome even accounting for these confounders (Drake et al., 2000; Chang et al., 2012). More research is needed into the relationship between DUI and outcome in the UHR group to establish whether these same factors contribute to poor help-seeking and whether DUI continues to have a direct effect on employment outcome after adjusting for these variables.

**4.3. Strengths and limitations**

To date, studies in the UHR group have almost exclusively focused on clinician-rated scales to examine functioning (Cotter et al., 2014). Comparatively little research has been conducted using ‘real-world’ functional outcomes such as employment. Exploration of different domains of functioning is important as these may be differentially affected and deficits may be driven by different aspects of illness (Strassnig et al., 2015). Recent evidence in the UHR group suggests social and occupational functioning are dissociable domains that are not always correlated with one another (Cornblatt et al., 2007; Cotter et al., 2014, 2015b).

Strengths of this study include the large sample size and longer length of follow-up compared to previous longitudinal studies that have reported employment outcome data in this population (Velthorst et al., 2011; Salokangas et al., 2013). A limitation of this work is that there was no record of how many of the UHR cohort were unable to work due to physical or mental disability. Previous research has reported that approximately 50% of unemployed UHR patients were unable to work due to sickness or disability 18-months after initial presentation (Salokangas et al., 2013). More detailed evaluation of this would have been useful to establish the extent to which unemployment was associated with inability to work in this sample.

We believe that this is the first study to examine predictors of long-term employment outcome in this population. While a broad range of clinical and demographic variables were included, a large amount of variance in employment status was unexplained in the multivariate analyses. An important limitation is that no data on occupational status at baseline was available for 41.5% of the sample. Instead, we used QLS occupational functioning scores as a proxy for baseline employment in the main analyses. The point-biserial correlation between these variables indicated that this served as a reasonable substitute for employment status at baseline among the wider cohort.

Previous longitudinal research in patients experiencing a first-episode of psychosis identified cognitive deficits to be a significant predictor of sustained unemployment (Chang et al., 2014). Aside from IQ, we had insufficient data to examine the impact of neurocognitive variables on long-term employment status. Social cognition has also been associated with poor functioning in the UHR group (Barbato et al., 2013; Cotter et al., 2015b), but was not examined in this cohort. These should be considered in future research investigating vocational outcomes in the UHR group.

**4.4. Conclusions**

Almost a quarter of UHR individuals in this cohort were unemployed at long-term follow-up. Vocational interventions may be useful in this population and warrant further investigation. DUI is a potentially modifiable risk factor for long-term employment outcome in this group. While the experience of childhood trauma in an individual is not itself mutable, interventions to reduce the likelihood of revictimization, PTSD and improve engagement with treatment may also reduce the impact of trauma on vocational functioning.

**References**

Aas, M., Dazzan, P., Mondelli, V., Melle, I., Murray, R.M., Pariante, C.M., 2014. A systematic review of cognitive function in first-episode psychosis, including a discussion on childhood trauma, stress, and inflammation. Front. Psychiatry 4, 182.

Addington, J., Cornblatt, B.A., Cadenhead, K.S., Cannon, T.D., McGlashan, T.H., Perkins, D.O., Seidman, L.J., Tsuang, M.T., Walker, E.F., Woods, S.W., Heinssen, R., 2011. At clinical high risk for psychosis: outcome for nonconverters. Am. J. Psychiatry 168 (8), 800-805.

Andreasen, N.C., 1984. Scale for the Assessment of Negative Symptoms. University of Iowa Press, Iowa City.

Barbato, M., Liu, L., Penn, D.L., Keefe, R.S., Perkins, D.O., Woods, S.W., Addington, J., 2013. Social cognition as a mediator between neurocognition and functional outcome in individuals at clinical high risk for psychosis. Schizophr. Res. 150 (2-3), 542-546.

Barnes, T.R., Hutton, S.B., Chapman, M.J., Mutsatsa, S., Puri, B.K., Joyce, E.M., 2000. West London first-episode study of schizophrenia. Clinical correlates of duration of untreated psychosis. Br. J. Psychiatry 77, 207-211.

Bernstein, D.P., Stein, J.A., Newcomb, M.D., Walker, E., Pogge, D., Ahluvalia, T., Stokes, J., Handelsman, L., Medrano, M., Desmond, D., Zule, W., 2003. Development and validation of a brief screening version of the Childhood Trauma Questionnaire. Child Abuse Negl. 27 (2), 169-190.

Bond, G.R., Drake, R.E., Luciano, A., 2015. Employment and educational outcomes in early intervention programmes for early psychosis: a systematic review. Epidemiol. Psychiatr. Sci. 24 (5), 446-457.

Boonstra, N., Klaassen, R., Sytema, S., Marshall, M., De Haan, L., Wunderink, L., Wiersma, D., 2012. Duration of untreated psychosis and negative symptoms - a systematic review and meta-analysis of individual patient data. Schizophr. Res. 142 (1-3), 12-19.

Brandizzi, M., Valmaggia, L., Byrne, M., Jones, C., Iwegbu, N., Badger, S., McGuire P., Fusar-Poli, P., 2015. Predictors of functional outcome in individuals at high clinical risk for psychosis at six years follow-up. J. Psychiatr. Res. 65, 115-123.

Chang, W.C., Man Tang, J.Y., Ming Hui, C.L., Wa Chan, S.K., Ming Lee, E.H., Hai Chen, E.Y., 2014. Clinical and cognitive predictors of vocational outcome in first-episode schizophrenia: a prospective 3 year follow-up study. Psychiatry Res. 220 (3), 834-839.

Chang, W.C., Tang, J.Y., Hui, C.L., Lam, M.M., Wong, G.H., Chan, S.K., Chiu, C.P., Chung, D.W., Law, C.W., Tso, S., Chan, K., Hung, S.F., Chen, E.Y., 2012. Duration of untreated psychosis: relationship with baseline characteristics and three-year outcome in first-episode psychosis. Psychiatry Res. 198 (3), 360-365.

Cornblatt, B.A., Auther, A.M., Niendam, T., Smith, C.W., Zinberg, J., Bearden, C.E., Cannon, T.D., 2007. Preliminary findings for two new measures of social and role functioning in the prodromal phase of schizophrenia. Schizophr. Bull. 33 (3), 688-702.

Cotter, J., Bartholomeusz, C., Papas, A., Allott, K., Nelson, B., Yung, A.R., Thompson, A., 2015b. Examining the association between social cognition and functioning in individuals at ultra-high risk for psychosis. Aust. N. Z. J. Psychiatry (in press).

Cotter, J., Drake, R.J., Bucci, S., Firth, J., Edge, D., Yung, A.R., 2014. What drives poor functioning in the at-risk mental state? A systematic review. Schizophr. Res. 159 (2-3), 267-277.

Cotter, J., Drake, R.J., Yung, A.R., 2016a. Adulthood revictimization: looking beyond childhood trauma. Acta Psychiatr. Scand. 134 (4), 368.

Cotter, J., Kaess, M., Yung, A.R., 2015a. Childhood trauma and functional disability in psychosis, bipolar disorder and borderline personality disorder: a review of the literature. Ir. J. Psychol. Med. 32 (1), 21-30.

Cotter, J., Zabel E., French, P., Yung A.R., 2016b. Prolonged duration of untreated psychosis: a problem that needs addressing. Early Interv. Psychiatry (in press).

Drake, R.J., Haley, C.J., Akhtar, S., Lewis, S.W., 2000. Causes and consequences of duration of untreated psychosis in schizophrenia. Br. J. Psychiatry 177, 511-515.

Fusar-Poli, P., Borgwardt, S., Bechdolf, A., Addington, J., Riecher-Rössler, A., Schultze-Lutter, F., Keshavan, M., Wood, S., Ruhrmann, S., Seidman, L.J., Valmaggia, L., Cannon, T., Velthorst, E., De Haan, L., Cornblatt, B., Bonoldi, I., Birchwood, M., McGlashan, T., Carpenter, W., McGorry, P., Klosterkötter, J., McGuire, P., Yung, A., 2013a. The psychosis high-risk state: a comprehensive state-of-the-art review. JAMA Psychiatry 70 (1), 107-120.

Fusar-Poli, P., Byrne, M., Badger, S., Valmaggia, L.R., McGuire, P.K., 2013b. Outreach and support in south London (OASIS), 2001-2011: ten years of early diagnosis and treatment for young individuals at high clinical risk for psychosis. Eur. Psychiatry 28 (5), 315-326.

Fusar-Poli, P., Byrne, M., Valmaggia, L., Day, F., Tabraham, P., Johns, L., McGuire, P., OASIS Team, 2010. Social dysfunction predicts two years clinical outcome in people at ultra high risk for psychosis. J. Psychiatr. Res. 44 (5), 294-301.

Galletly, C., Castle, D., Dark, F., Humberstone, V., Jablensky, A., Killackey, E., Kulkarni, J., McGorry, P., Nielssen, O., Tran, N., 2016. Royal Australian and New Zealand College of Psychiatrists clinical practice guidelines for the management of schizophrenia and related disorders. Aust. N. Z. J. Psychiatry 50 (5), 410-472.

Gumley, A.I., Taylor, H.E., Schwannauer, M., MacBeth, A., 2014. A systematic review of attachment and psychosis: measurement, construct validity and outcomes. Acta Psychiatr. Scand. 129 (4), 257-274.

Heinrichs, D.W., Hanlon, T.E., Carpenter, W.T., 1984. The Quality of Life Scale: an instrument for rating the schizophrenic deficit syndrome. Schizophr. Bull. 10 (3), 388-398.

Hill, M., Crumlish, N., Clarke, M., Whitty, P., Owens, E., Renwick, L., Browne, S., Macklin, E.A., Kinsella, A., Larkin, C., Waddington, J.L., O'Callaghan, E., 2012. Prospective relationship of duration of untreated psychosis to psychopathology and functional outcome over 12 years. Schizophr. Res. 141 (2-3), 215-221.

Killackey, E., Jackson, H.J., McGorry, P.D., 2008. Vocational intervention in first-episode psychosis: individual placement and support v. treatment as usual. Br. J. Psychiatry 193 (2), 114-120.

Knapp, M., Mangalore, R., Simon, J., 2004. The global costs of schizophrenia. Schizophr. Bull. 30 (2), 279-293.

Kraan, T., van Dam, D.S., Velthorst, E., de Ruigh, E.L., Nieman, D.H., Durston, S., Schothorst, P., van der Gaag, M., de Haan, L., 2015b. Childhood trauma and clinical outcome in patients at ultra-high risk of transition to psychosis. Schizophr. Res. 169 (1-3), 193-198.

Kraan, T., Velthorst, E., Smit, F., de Haan, L., van der Gaag, M., 2015a. Trauma and recent life events in individuals at ultra high risk for psychosis: review and meta-analysis. Schizophr. Res. 61 (2-3), 143-149.

Kreyenbuhl, J., Buchanan, R.W., Dickerson, F.B., Dixon, L.B., 2010. The Schizophrenia Patient Outcomes Research Team (PORT): updated treatment recommendations 2009. Schizophr. Bull. 36 (1), 94-103.

Lin, A., Wood, S.J., Nelson, B., Beavan, A., McGorry, P., Yung, A.R., 2015. Outcomes of nontransitioned cases in a sample at ultra-high risk for psychosis. Am. J. Psychiatry 172 (3), 249-258.

Lin, A., Wood, S.J., Nelson, B., Brewer, W.J., Spiliotacopoulos, D., Bruxner, A., Broussard, C., Pantelis, C., Yung, A.R., 2011. Neurocognitive predictors of functional outcome two to 13 years after identification as ultra-high risk for psychosis. Schizophr. Res. 132 (1), 1-7.

Marwaha, S., Johnson, S., Bebbington, P., Stafford, M., Angermeyer, M.C., Brugha, T., Azorin, J.M., Kilian, R., Hansen, K., Toumi, M., 2007. Rates and correlates of employment in people with schizophrenia in the UK, France and Germany. Br. J. Psychiatry 191, 30-37.

Marwaha, S., Johnson, S., 2004. Schizophrenia and employment - a review. Soc. Psychiatry Psychiatr. Epidemiol. 39 (5), 337-349.

Mueser, K.T., Essock, S.M., Haines, M., Wolfe, R., Xie, H., 2004a. Posttraumatic stress disorder, supported employment, and outcomes in people with severe mental illness. CNS Spectr. 9 (12), 913-925.

Mueser, K.T., Salyers, M.P., Rosenberg, S.D., Goodman, L.A., Essock, S.M., Osher, F.C., Swartz, M.S., Butterfield, M.I., 5 Site Health and Risk Study Research Committee, 2004b. Interpersonal trauma and posttraumatic stress disorder in patients with severe mental illness: demographic, clinical, and health correlates. Schizophr. Bull. 30 (1), 45-57.

National Institute for Health and Care Excellence, 2014. Psychosis and schizophrenia in adults: prevention and management (CG178). NICE, London.

Nelson, B., Yuen, H.P., Wood, S.J., Lin, A., Spiliotacopoulos, D., Bruxner, A., Broussard, C., Simmons, M., Foley, D.L., Brewer, W.J., Francey, S.M., Amminger, G.P., Thompson, A., McGorry, P.D., Yung, A.R., 2013. Long-term follow-up of a group at ultra high risk ("prodromal") for psychosis: the PACE 400 study. JAMA Psychiatry 70 (8), 793-802.

NHS England, 2016. Implementing the early intervention in psychosis access and waiting time standard: guidance. NHS England, London.

Overall, J.E., Gorham, D.R., 1962. The brief psychiatric rating scale. Psychol. Rep. 10, 799-812.

Ports, K.A., Ford, D.C., Merrick, M.T., 2016. Adverse childhood experiences and sexual victimization in adulthood. Child Abuse Negl. 51, 313-322.

Ramsay, C.E., Broussard, B., Goulding, S.M., Cristofaro, S., Hall, D., Kaslow, N.J., Killackey, E., Penn, D., Compton, M.T., 2011. Life and treatment goals of individuals hospitalized for first-episode nonaffective psychosis. Psychiatry Res. 189 (3), 344-348.

Rinaldi, M., Killackey, E., Smith, J., Shepherd, G., Singh, S.P., Craig, T., 2010. First episode psychosis and employment: a review. Int. Rev. Psychiatry 22 (2), 148-162.

Salokangas, R.K., Nieman, D.H., Heinimaa, M., Svirskis, T., Luutonen, S., From, T., von Reventlow, H.G., Juckel, G., Linszen, D., Dingemans, P., Birchwood, M., Patterson, P., Schultze-Lutter, F., Klosterkötter, J., Ruhrmann, S., EPOS group, 2013. Psychosocial outcome in patients at clinical high risk of psychosis: a prospective follow-up. Soc. Psychiatry Psychiatr. Epidemiol. 48 (2), 303-311.

Stowkowy, J., Liu, L., Cadenhead, K.S., Cannon, T.D., Cornblatt, B.A., McGlashan, T.H., Perkins, D.O., Seidman, L.J., Tsuang, M.T., Walker, E.F., Woods, S.W., Bearden, C.E., Mathalon, D.H., Addington, J., 2016. Early traumatic experiences, perceived discrimination and conversion to psychosis in those at clinical high risk for psychosis. Soc. Psychiatry Psychiatr. Epidemiol. 51 (4), 497-503.

Strassnig, M.T., Raykov, T., O'Gorman, C., Bowie, C.R., Sabbag, S., Durand, D., Patterson, T.L., Pinkham, A., Penn, D.L., Harvey, P.D., 2015. Determinants of different aspects of everyday outcome in schizophrenia: the roles of negative symptoms, cognition, and functional capacity. Schizophr. Res. 165 (1), 76-82.

Thompson, A.D., Nelson, B., Yuen, H.P., Lin, A., Amminger, G.P., McGorry, P.D., Wood, S.J., Yung, A.R., 2014. Sexual trauma increases the risk of developing psychosis in an ultra high-risk "prodromal" population. Schizophr. Bull. 40 (3), 697-706.

Velthorst, E., Nieman, D.H., Klaassen, R.M., Becker, H.E., Dingemans, P.M., Linszen, D.H., De Haan, L., 2011. Three-year course of clinical symptomatology in young people at ultra high risk for transition to psychosis. Acta Psychiatr. Scand. 123 (1), 36-42.

Viola, S., Moncrieff, J., 2016. Claims for sickness and disability benefits owing to mental disorders in the UK: trends from 1995 to 2014. Br. J. Psychiatry Open 2 (1), 18-24.

Waghorn, G., Saha, S., Harvey, C., Morgan, V.A., Waterreus, A., Bush, R., Castle, D., Galletly, C., Stain, H.J., Neil, A.L., McGorry, P., McGrath, J.J., 2012. 'Earning and learning' in those with psychotic disorders: the second Australian national survey of psychosis. Aust. N. Z. J. Psychiatry 46 (8), 774-785.

Yung, A.R., Cotter, J., Wood, S.J., McGorry, P., Thompson, A.D., Nelson, B., Lin, A., 2015. Childhood maltreatment and transition to psychotic disorder independently predict long-term functioning in young people at ultra-high risk for psychosis. Psychol. Med. 45 (16), 3453-3465.

Yung, A.R., McGorry, P.D., McFarlane, C.A., Jackson, H.J., Patton, G.C., Rakkar, A., 1996. Monitoring and care of young people at incipient risk of psychosis. Schizophr. Bull. 22 (2), 283-303.

Yung, A.R., Phillips, L.J., McGorry, P.D., McFarlane, C.A., Francey, S., Harrigan, S., Patton, G.C., Jackson, H.J., 1998. Prediction of psychosis. A step towards indicated prevention of schizophrenia. Br. J. Psychiatry 172 (suppl 33), 14-20.

Yung, A.R., Yuen, H.P., McGorry, P.D., Phillips, L.J., Kelly, D., Dell'Olio, M., Francey, S.M., Cosgrave, E.M., Killackey, E., Stanford, C., Godfrey, K., Buckby, J., 2005. Mapping the onset of psychosis: the Comprehensive Assessment of At-Risk Mental States. Aust. N. Z. J. Psychiatry 39 (11-12), 964-971.

**Table 1: Clinical and demographic group characteristics according to employment outcome**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Employed at follow-up**  **(*n* = 184)** | |  | **Unemployed at follow-up**  **(*n* = 62)** | |  |  |  |
| ***Baseline*** | | ***Available cases*** | **Mean (*SD*)** |  | ***Available cases*** | **Mean (*SD*)** | ***t*** | ***df*** | ***p*** |
| Age (years) | | 184 | 18.48 (3.24) |  | 62 | 18.95 (3.29) | -0.979 | 244 | .329 |
| Duration of untreated illness (days) | | 173 | 374.58 (473.84) |  | 53 | 531.09 (539.34) | -2.035 | 224 | .043 |
| CAARMS positive symptoms | | 178 | 6.26 (2.77) |  | 55 | 7.05 (2.30) | 1.922 | 231 | .056 |
| CAARMS negative symptoms | | 178 | 7.64 (3.07) |  | 55 | 8.11 (3.03) | 0.992 | 231 | .322 |
| BPRS psychotic subscale | | 181 | 9.38 (2.91) |  | 62 | 9.66 (3.50) | -0.620 | 241 | .536 |
| SANS total | | 182 | 18.46 (12.41) |  | 62 | 24.06 (14.61) | -2.708 | 92.8 | .008 |
| HAM-A | | 71 | 16.08 (8.92) |  | 26 | 15.15 (6.94) | 0.481 | 95 | .632 |
| HAM-D | | 116 | 18.92 (9.82) |  | 42 | 18.93 (10.17) | -0.003 | 156 | .997 |
| Social functioning (QLS subscale) | | 180 | 30.58 (10.40) |  | 61 | 25.74 (12.25) | -2.770 | 91.1 | .007 |
| Occupational functioning (QLS subscale) | | 180 | 13.74 (6.78) |  | 61 | 10.49 (7.30) | -3.169 | 239 | .002 |
| CTQ total | | 161 | 45.57 (17.68) |  | 51 | 53.22 (20.46) | -2.589 | 210 | .010 |
| Full-scale IQ | | 156 | 99.73 (12.91) |  | 44 | 95.09 (14.73) | -2.040 | 198 | .043 |
|  |  |  |  |  |  |  |  |  |  |
|  | | ***n*** | **%** |  | ***n*** | **%** | **χ2** | ***p*** |  |
| Female gender | | 102 | 55.4 |  | 29 | 46.8 | 1.397 | .237 |  |
| Any psychiatric disorder | | 136 | 73.9 |  | 42 | 67.7 | 0.577 | .447 |  |
| Anxiety disorder | | 60 | 32.6 |  | 23 | 37.1 | 1.009 | .315 |  |
| Mood disorder | | 121 | 65.8 |  | 34 | 54.8 | 1.005 | .316 |  |
| Substance use disorder | | 39 | 21.2 |  | 16 | 25.8 | 0.655 | .418 |  |
| PACE clinic entry criteriaa | |  |  |  |  |  |  |  |  |
| APS only | | 117 | 63.6 |  | 31 | 50 |  |  |  |
| BLIPS only | | 7 | 3.8 |  | 4 | 6.5 |  |  |  |
| Vulnerability only | | 24 | 13.0 |  | 10 | 16.1 |  |  |  |
| APS and BLIPS | | 7 | 3.8 |  | 4 | 6.5 |  |  |  |
| APS and vulnerability | | 18 | 9.8 |  | 6 | 9.7 |  |  |  |
| BLIPS and vulnerability | | 2 | 1.1 |  | 0 | 0 |  |  |  |
| All three criteria | | 5 | 2.7 |  | 1 | 1.6 |  |  |  |
|  | |  |  |  |  |  |  |  |  |
| ***Follow-up*** | | ***Available cases*** | **Mean (*SD*)** |  | ***Available cases*** | **Mean (*SD*)** | ***t*** | ***df*** | ***p*** |
| Age (years) | | 184 | 25.67 (4.98) |  | 62 | 27.10 (5.18) | -1.934 | 244 | .054 |
| Length of follow-up (years) | | 183 | 7.20 (3.11) |  | 62 | 8.11 (3.69) | -1.760 | 92.1 | .082 |
| BPRS psychotic subscale | | 183 | 6.15 (3.32) |  | 62 | 8.42 (4.05) | -3.976 | 90.3 | < .001 |
| SANS total | | 182 | 7.77 (9.57) |  | 61 | 21.79 (17.89) | -5.843 | 71.9 | < .001 |
| HAM-A | | 184 | 7.53 (6.95) |  | 61 | 12.07 (8.93) | -3.618 | 85.4 | .001 |
| HAM-D | | 184 | 7.66 (7.84) |  | 62 | 13.82 (10.69) | -4.180 | 84.2 | < .001 |
| Social functioning (QLS subscale) | | 184 | 39.38 (9.44) |  | 62 | 29.26 (12.59) | -5.805 | 85.2 | < .001 |
| Occupational functioning (QLS subscale) | | 183 | 20.63 (4.20) |  | 62 | 8.53 (6.19) | -14.327 | 80.9 | < .001 |
| Full-scale IQ | | 175 | 103.23 (14.25) |  | 58 | 97.12 (14.89) | -2.798 | 231 | .006 |
|  |  |  |  |  |  |  |  |  |  |
|  | | ***n*** | **%** |  | ***n*** | **%** | **χ2** | ***p*** |  |
| Any psychiatric disorder | | 137 | 74.5 |  | 57 | 91.9 | 8.499 | .004 |  |
| Psychotic disorder | | 45 | 24.5 |  | 24 | 38.7 | 4.668 | .031 |  |
| Anxiety disorder | | 67 | 36.4 |  | 32 | 51.6 | 4.455 | .035 |  |
| Mood disorder | | 92 | 50 |  | 44 | 71 | 8.247 | .004 |  |
| Substance use disorder | | 60 | 32.6 |  | 32 | 51.6 | 7.154 | .007 |  |
| Completed high schoolb | | 107 | 58.2 |  | 23 | 37.1 | 8.927 | .003 |  |
| Living independently | | 102 | 55.4 |  | 28 | 45.2 | 1.964 | .161 |  |
| In a romantic relationship | | 98 | 53.3 |  | 17 | 27.4 | 12.440 | < .001 |  |

**Abbreviations:** APS: Attenuated psychotic symptoms; BLIPS: Brief limited intermittent psychotic symptoms; BPRS: Brief Psychiatric Rating Scale; CAARMS: Comprehensive Assessment of At Risk Mental States; CTQ: Childhood Trauma Questionnaire; HAM-A: Hamilton Rating Scale for Anxiety; HAM-D: Hamilton Rating Scale for Depression; PACE: Personal Assessment and Crisis Evaluation; QLS: Quality of Life Scale; SANS: Scale for the Assessment of Negative Symptoms

a PACE entry criteria data was unavailable for four employed and six unemployed patients. Chi-square was not calculated for group differences in PACE entry criteria because, in some instances, the expected number of cases in each cell was less than 5

b High school completion data was unavailable for five employed and one unemployed patients

**Table 2: Final multivariate model of baseline predictors of employment status at follow-up**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Model:** χ2 = 21.036, df = 11, *p* = .033, Nagelkerke *R*2 = .194, Full data available for *n* = 161 | | | | | |
| **Variables** | ***B* (SE)** | **Wald** | **Odds ratio** | **95% CI** | ***p*-value** |
| Age (years) | .035 (.074) | 0.222 | 1.035 | 0.896, 1.197 | .638 |
| Sex | .604 (.450) | 1.799 | 1.829 | 0.757, 4.420 | .180 |
| CTQ total | -.031 (.012) | 7.161 | 0.969 | 0.948, 0.992 | .007 |
| Full-scale IQ | .004 (.016) | 0.047 | 1.004 | 0.972, 1.036 | .829 |
| Duration of untreated illness (months) | -.025 (.013) | 3.881 | 0.975 | 0.951, 1.000 | .049 |
| SANS total | .000 (.022) | 0.000 | 1.000 | 0.958, 1.044 | .995 |
| CAARMS positive symptoms | -.037 (.089) | 0.170 | 0.964 | 0.810, 1.148 | .680 |
| Social functioning (QLS subscale) | .049 (.026) | 3.415 | 1.050 | 0.997, 1.105 | .065 |
| Occupational functioning (QLS subscale) | .004 (.039) | 0.008 | 1.004 | 0.931, 1.082 | .927 |
| Length of follow-up (years) | -.104 (.077) | 1.837 | 0.901 | 0.775, 1.048 | .175 |
| Transition to psychosis status | .584 (.597) | 0.955 | 1.793 | 0.556, 5.784 | .328 |

**Note:** *B*: Unstandardized regression coefficients. df for each predictor variable is 1. Odds ratio is equivalent to Exp(B)

**Abbreviations:** CAARMS: Comprehensive Assessment of At Risk Mental States; CTQ: Childhood Trauma Questionnaire; QLS: Quality of Life Scale; SANS: Scale for the Assessment of Negative Symptoms