



Parental socioeconomic status and prognosis in individuals with ultra-high risk for psychosis: A 2-year follow-up study

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ARTICLE INFO

Article history:

Received 2 May 2015

Received in revised form 22 June 2015

Accepted 13 July 2015

Available online 26 July 2015

Keywords:

Ultra-high risk

Socioeconomic status

Prognosis

Psychosis

Follow-up

ABSTRACT

A possible relationship between socioeconomic status (SES) and the development of mental illness has been continuously suggested. Still, less clear is whether the SES has a direct effect on the development of schizophrenia. In this longitudinal study, we test the hypothesis that parental SES is associated with the prognosis of individuals at ultra-high risk (UHR) for psychosis. One hundred and sixteen individuals who were determined as UHR using a Comprehensive Assessment of At-Risk Mental States (CAARMS) were classified into three groups based on the parental SES levels assessed by the Hollingshead–Redlich scale. There were no differences in the Positive and Negative Syndrome Scale (PANSS), the Scale for the Assessment of Positive Symptoms (SAPS), the Scale for the Assessment of Negative Symptoms (SANS) and the Brief Psychiatric Rating Scale (BPRS) at baseline. However, at the 1-year follow-up, the higher versus lower SES group showed significant differences in clinical measures including SAPS, SANS, PANSS positive and negative scales as well as BPRS scores. Most of these clinical differences were attenuated by the second year of follow-up with no sign of an increased rate of conversion to psychosis derived from a socioeconomically disadvantaged status. However, SAPS and PANSS positive scale still revealed sub-threshold positive symptoms within the low SES group at the 2-year follow-up. Moreover, especially for the subjects who continued the follow-ups for 1 year and/or 2 years, the changes of clinical symptoms between the baseline and follow-ups showed that there were significant symptom changes in higher and middle SES groups within the 1-year period already, but the lower SES group showed significant recovery at the second year. Our findings suggest that low parental SES can be detrimental to the prognosis phase of individuals at UHR. Limited supportive socioeconomic resources may slow the rate of symptom recovery in UHR subjects.

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1. Introduction

Sociologists have compared the relationship between health and socioeconomic status (SES) to the relationship between survival status and the location of passengers on the *Titanic*, where first-class passengers had easier access to life-saving devices than other passengers (Yu and Williams, 1999). SES is a multi-dimensional, hierarchical concept that includes accessibility to valued commodities such as wealth, parental educational level, occupational prestige, social influence and cultural resources (House, 1981; Mueller and Toby, 1981). In the mental health field, a considerable amount of epidemiological literature has reported associations between SES and mental disorders, from attention deficit hyperactivity disorder and alcohol dependence to mood disorders (Aro et al., 1995; Gilman et al., 2002; Keyes and Hasin, 2008;

Murphy and Barkley, 1996). There were genetically influenced individual differences in susceptibility to environmental experiences like maltreatment, a concept referred to as “gene–environment interaction” (GxE; Kendler & Eaves, 1986; Rutter & Silberg, 2002). The GxE concept is familiar to clinicians as the “host–pathogen interaction” in a patient’s vulnerability or resistance to disease (Evans & Relling, 1999; Hill, 1999) and to developmentalists as the “diathesis–stress” interaction in an individual’s vulnerability or resistance to pathogenic experiences (Monroe & Simons, 1991).

In particular, many studies have focused on the risk for schizophrenia in those with lower SES (Dohrenwend et al., 1992; Samele et al., 2001; Werner et al., 2007). Gene–environment interaction (GxE) of schizophrenia is well-known (van Winkel et al., 2008), and the disadvantaged environment is usually used to explain an individual’s vulnerability or resistance to the pathogenesis of schizophrenia (van Os et al., 2010). They have noted that schizophrenia patients with low SES may be more likely to be exposed to the danger of stressful life events, a lack of social support, and even to immunologic disorders

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which may be related to the risk for psychosis (Pearce and Davey Smith, 2003; Tsai et al., 2014). However, different opinions still exist (Byrne et al., 2004); some researchers have suggested that the current SES plays an indirect and marginal role in the onset of full-blown psychosis (Kirkbride et al., 2008). Moreover, some have insisted that a low SES of either the individual or the parents may be a ramification derived from mental disorders and not a preceding factor of these disorders (Goldberg and Morrison, 1963; Jones et al., 1993).

Therefore, in this respect, investigation into the association between parental SES and the prognosis of individuals who are at potential risk for psychosis will provide significant insight into this controversy. Over the past decade, interest in individuals at ultra-high risk for psychosis (UHR) has increased in hopes that either prospective or retrospective research involving UHR individuals may provide insights about risks or protective factors that may affect an individual's potential transition into psychosis (Cannon et al., 2008; Yung et al., 2007). UHR (Yung et al., 2004), clinical high risk (CHR) (McGlashan et al., 2003), or at-risk-mental-state (ARMS) (Broome et al., 2005) refers to the imminent risk of developing psychosis. Individuals at UHR are generally assessed in clinical interviews with the Comprehensive Assessment of At-Risk Mental States (CAARMS) (Yung et al., 2005), Structural Interview for Psychosis-Risk Syndromes (SIPS) (McGlashan et al., 2010) or Schizophrenia Proneness Instrument, Adult version (SPI-A) (Schutze-Lutter et al., 2007). Intervention commonly employs the use of psychiatric medication and/or of cognitive-behavioral test (Fusar-Poli et al., 2007; van der Gaag et al., 2012).

Here, we have focused on the parental SES of individuals at UHR and their longitudinal progression of clinical symptoms. The effects of SES on clinical aspects are considered to be less volatile compared to other demographic data such as age, years of education or even family income (McLoyd, 1998). That is, the prospective research on parental SES and the related progression of clinical symptoms in UHR participants may have the advantage of its findings being free from confounding effects such as the potential downward drift of the SES of the participant due to the onset of his/her psychosis, as well as retrospective bias (Gluud, 2006). Additionally, because of the periodic occurrence of prodromal psychotic-like experiences (Häfner et al., 1998), the UHR individuals are bound to be comprised of adolescents and young adults who are not yet financially independent from their families. Because youths tend to become financially independent at a significantly older age in South Korea as compared to young people in Europe or the US, the Korean youth population seems like a reasonable sample in which to explore the effect of parental SES (Choi, 2011).

In this study, we tested the hypothesis that the parental SES correlates with the progression of symptoms in UHR subjects. Therefore, we considered the following three questions: (a) Is there a significant difference in the prognosis across different socioeconomic groups during the 1-year follow-up period? (b) Is there a group difference during the 2-year follow-up period? (c) Is there any group difference in the rate of transition to psychosis?

2. Methods

2.1. Participants

Subjects were recruited from the Seoul Youth Clinic between January 2005 and January 2014. The UHR subjects were defined according to the Comprehensive Assessment of At-Risk Mental States (CAARMS) criteria (Yung et al., 2005) and the Korean version of the Structured Interview for Prodromal Syndromes (Jung et al., 2010; Miller et al., 2003). Subjects also completed the non-patient form of the SCID (SCID-NP) (First et al., 1995). Exclusion criteria for the present study included medical or neurological disorders or substance abuse, IQ ≤ 75 , and a family history of psychiatric illnesses. IQ was estimated using an abbreviated form of the Korean version of the Wechsler Adult Intelligence Scale (WAIS) consisting of the Vocabulary,

Arithmetic, Block Design, and Picture Arrangement subtests (Lee and Kim, 1995) by advanced psychology graduate students who had been trained in neurocognitive assessment. A total of 116 individuals who had enough clinical and neurocognitive data to analyze and who had no reasons for disqualification were included in present study. The UHR group was classified as members of the attenuated psychosis group ($n = 97$), the brief limited intermittent psychotic symptom group ($n = 1$), or the vulnerability group ($n = 7$). Eleven subjects met the criteria for both the attenuated psychosis and the vulnerability groups (Cannon et al., 2008). A proportion of the participants used atypical antipsychotics ($n = 22$, 19.0%), antidepressants ($n = 45$, 38.8%), and anxiolytics ($n = 49$, 42.2%) during follow-up.

SES classes were assessed using the Hollingshead–Redlich scale (Hollingshead and Redlich, 1958). This indicator of SES, which is comprised of five levels (Class I = highest level, Class V = lowest level), reflects two factors: occupational status and educational achievement. To ensure sufficient sample size, the original SES groups were regrouped into three levels in accordance with recommendations from a previous study (Goldberg and Morrison, 1963): two high-income groups (Higher SES; Class I and II), middle-class (Middle SES; Class III), and two low-income groups (Lower SES; Class IV and V). All subjects provided written informed consent approved by the Institutional Review Board at Seoul National University Hospital.

2.2. Assessments

Among the 116 participants (53 higher SES, 32 middle SES, and 31 lower SES), the following assessments were carried out at baseline and at 1-year (26 higher SES, 18 middle SES, and 19 lower SES) and 2-year follow-ups (17 higher SES, 12 middle SES, and 13 lower SES). There was no significant group difference among follow-up rate (1-year follow-up rate, $\chi^2 = 1.25$, $P = .536$; 2-year follow-up rate, $\chi^2 = 0.86$, $P = .652$). The main reason for a lack of follow-ups was poor adherence (accounting for half of those not followed-up) and voluntary withdrawal from follow-up as symptoms decreased. Overall, the follow-up for 15 participants were immediately halted when they converted into full-blown psychosis. Eleven participants were not yet due for follow-up visit.

The subjects were administered the Positive and Negative Syndrome Scale (PANSS: a measure of the positive, negative, and general symptoms in the schizophrenia spectrum disorder) (Kay et al., 1987), the Scale for the Assessment of Positive Symptoms (SAPS: assessments for positive symptoms such as delusions, hallucinations, bizarre behavior and positive formal thought disorder) (Andreasen, 1984), and the Scale for the Assessment of Negative Symptoms (SANS: assessments for negative symptoms such as flat affect, avolition, anhedonia, and attentional disturbances) (Andreasen, 1983) as well as the Brief Psychiatric Rating Scale (BPRS) (Overall and Gorham, 1962). For the clinical characteristics, the results of the analysis for participants who were available at 1-year or 2-year follow-ups did not reveal any significant differences from the baseline measurements (all P s $> .05$).

2.3. Statistical analyses

The ANOVA tests were used for continuous data, and χ^2 tests were used for categorical data at each of the three assessment points to examine significant differences among groups. For analysis of the 2-year follow-up data with a reduced sample size, the Kruskal–Wallis test was simultaneously used in order to confirm the results of a parametric analysis. Change in participants' symptoms from baseline to follow-up was analyzed using the Wilcoxon signed-rank test. Missing values were estimated with the expectation-maximization algorithm.

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