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Seasonality and its distinct clinical correlates in bipolar II disorder

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ABSTRACT

Seasonality is one of the key features in subjects with mood disorders and is involved in the multi-faceted nature of the clinical course. However, few studies have explored the clinical implications of seasonality in bipolar disorders. We examined the differential effects of seasonality on clinical variables between bipolar I and II disorder (BD I and II). Seasonality was assessed using the Seasonal Pattern Assessment Questionnaire (SPAQ) in 204 subjects with BD I and 308 with BD II. Following the comparisons between BD I and II groups, clinical characteristics related to seasonality were explored. Next, to predict the presence of seasonality, a logistic regression model was applied. The global seasonality score on the SPAQ was significantly higher in the BD II group than in the BD I group. In the BD I group, seasonality was associated with suicide attempt history. In the BD II group, on the other hand, seasonality was associated with female gender, depressive predominance, and premenstrual dysphoric disorder (PMDD). In the regression models, the presence of PMDD and female gender was significantly associated with seasonality in the BD II group. Our findings suggest that high seasonality tendency, a vulnerability maker for cyclic worsening, may contribute to a differential pattern of clinical characteristics in BD II.

1. Introduction

"Seasonality" means a tendency to experience seasonal variations in mood, behavior, and vegetative functions (Kasper et al., 1989). Seasonality has been most extensively studied in subjects with depressive disorders, and 11% of depressed people in a community sample were reported to have a seasonal subtype (Levitt et al., 2000). Symptoms of seasonal depression frequently include hyperphagia, hypersomnia, and loss of energy, which suggest that clinical features of seasonal depression may constitute a distinct clinical subtype similar to atypical depression (Howland, 2009; Tam et al., 1997). The most plausible explanation for the biological basis of seasonal affective disorder (SAD) has been the hypothesis of altered circadian rhythms, a hypothesis supported by the efficacy of light therapy. However, a growing body of evidence indicates a complex neurogenetic pathophysiology for SAD (Lam and Levitan, 2000), suggesting that the seasonal pattern in mood disorders may have various neurobiological causes and differential manifestations across subtypes.

Particularly, patients with bipolar disorders often have atypical depressive symptoms (Mitchell et al., 2001), and the pathophysiology of the disorder includes circadian abnormalities (Hasler et al., 2006). Regarding co-occurrence rates of bipolar disorders and SAD, up to 20% of patients with SAD were diagnosed as having bipolar I (BD I) or II disorder (BD II) in a prospective study (White et al., 1990), and more than 20% of patients with bipolar disorders showed seasonality in a case-control study that applied a self-report form (Choi et al., 2011) and in a cohort study that used DSM-IV specifier for seasonal pattern (Goikolea et al., 2007). Interestingly, in the latter studies seasonality appeared to be more prominent in BD II than in BD I. Evidence of association between seasonality and BD II has been reported in a prospective study that had followed monthly changes in clinical status over the year (Friedman et al., 2006). Meanwhile, premenstrual syndrome (PMS), another clinical presentation of a cyclic nature, has been reported to be more frequently found in patients with BD II than in controls (Choi et al., 2011). In this study, it also has been shown that PMS was related to seasonality in the combined group of BD I and BD II. Synthetically, despite methodological difference, previous studies consistently showed that seasonal changes in mood states are frequent in bipolar disorders, especially in BD II.

BD II is characterized by more recurrent depressive episodes, more prevailing subthreshold depressive symptoms and shorter

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inter-episode intervals (Judd et al., 2003). The operational criteria for a seasonal pattern require full remission or (hypo)manic changes at a characteristic time of the year, and two major depressive episodes during the last 2 years (Association Psychiatric Association, 2000). However the seasonality trait frequently found in patients with mood disorders, especially with BD II, often does not meet the strict criteria for SAD. In BD II, subsyndromal and minor depressive symptoms predominate during long-term courses (Judd et al., 2003). Minor depressive symptoms may have persisted or fluctuated during the period of interest, causing clinicians to abstain from diagnosing SAD. Therefore as suggested by Goikolea et al. (2007), the dimensional approach for seasonality can help complement categorical diagnoses, and may aid in exploring the nature of bipolar disorders by assessing their seasonality with scaling.

In the present study, we hypothesized that seasonality, as a sensitivity marker for environmental changes, may exert stronger or differential influences on clinical characteristics in BD II compared to BD I. Further, we hypothesized that these influences will be reflected in cyclic changes in mood symptoms such as PMDD. To quantify seasonality severity, we used the Seasonal Pattern Assessment Questionnaire (SPAQ).

2. Methods

2.1. Data source and subjects

We collected and analyzed data from patients who had visited the Mood Disorders Clinic of Seoul National University Bundang Hospital between November 1, 2004 and March 31, 2012. The data were collected from the systemic prospective follow-up registry of the Mood Disorders Clinic. The age range was limited to 18–65 years, and subjects were required to have no evidence of organic mental disorder, mental retardation, or medical illness related to mental symptoms. The subjects consisted of 204 patients with BD I and 308 patients with BD II who met the Diagnostic and Statistical Manual-IV (DSM-IV) criteria for BD I and II (American Psychiatric Association, 2000), respectively.

To be included in our registry, patients had to provide written informed consent for the collection of their data for research purposes. This study was approved by the institutional review board of Seoul National University Bundang Hospital.

2.2. Clinical characteristics

All subjects enrolled in the registry underwent an initial assessment interview by psychiatrists using a semi-structured interview form. The interview form consisted of a diagnostic part using the DSM-IV criteria, and a clinical characteristics part including demographic and illness variables, family history, past treatment and medical conditions. Variables included in this study were age at onset, age at treatment initiation, duration of untreated illness, number of previous mood episodes, polarity of first episode, family history of psychiatric disorders, history of rapid cycling, psychosis and suicidal attempts, frequency of depressive episodes (the number of depressive episodes divided by duration of illness) (Baek et al., 2011), and presence of premenstrual dysphoric disorder (PMDD). PMDD was assessed by a psychiatrist using a symptom list adopted from the DSM-IV criteria. The demographic characteristics of the subjects have been summarized in Table 1.

2.3. Assessment of seasonality

We assessed lifetime histories of seasonality using SPAQ (Rosenthal et al., 1987). SPAQ contains six items: sleep, appetite, weight, mood, energy, and social activity. Subjects report the severity of seasonal change for each item from 0 (no change), 1 (mild), 2 (moderate), 3 (marked), to 4 (extreme). The sum of individual item scores represents the global seasonality score (GSS). A GSS of higher than 11 and a subjective rating of having at least "moderate" difficulty with seasonal changes was regarded as SAD (Kasper et al., 1989). A less severe version of SAD, termed subsyndromal SAD (sSAD), was regarded as experiencing similar recurrent depressions but to a less severe degree. A GSS of higher than nine, but lower than 11, and a subjective rating of having at least "moderate" difficulty with seasonal changes, or a GSS above 11 and a subjective rating of having at least "mild" difficulty with seasonal changes was regarded as sSAD (Kasper et al., 1989). According to these criteria, we defined "SAD" and "seasonality (combining SAD and sSAD)." Because our interest included any type of seasonal fluctuation of mood symptoms, clinical variables were compared between patients with and without "seasonality" in each of the diagnostic groups.

Table 1
Sociodemographic characteristics of the subjects.

Variables	Bipolar I ($n=204$)	Bipolar II ($n=308$)	t	χ^2	p
Age, mean ± S.D.	33.5 ± 10.2	35.9 ± 11.0	0.93		0.34
Gender				9.66	0.002
Male, n (%)	78 (38.2)	78 (25.3)			
Female, n (%)	126 (61.8)	230 (74.7)			
Education years, mean ± S.D.	14.6 ± 2.3	14.4 ± 2.4	0.96		0.34
Occupation, present, n (%)	158 (77.5)	275 (89.3)		13.17	< 0.001
Marital status				6.03	0.02
Married, n (%)	90 (44.1)	170 (55.2)			
Unmarried, n (%)	114 (55.9)	138 (44.8)			

2.4. Data analysis

Group mean differences in demographic and clinical variables were examined using Student's t tests or chi-square tests for continuous responses or categorical variables, respectively. Patients with and without seasonality were compared on clinical variables using chi-square tests and Student's t tests for normally continuous variables. Then to measure effect sizes, we calculated Cohen's d where mean differences were tested. After single variable association tests were completed in each diagnostic group, a stepwise logistic regression using the forward selection method was performed to detect significant variables that were jointly related to the presence of seasonality. The significance cutoff for inclusion/exclusion in regression analysis was $p < 0.05$. We also included two variables, illness duration and number of episodes, that showed statistical significance on the logistic regression test of a previous study (Goikolea et al., 2007). The logistic regression was performed twice. For the first, to include the variable "presence of PMDD," analysis was done in only female subjects. For the second, analysis was conducted in the whole subject population, and the variable "presence of PMDD" was excluded. The level of significance was set at $p < 0.05$ for all other tests. All statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS) for Windows 21.0 (SPSS Inc., Chicago, USA).

3. Results

The mean GSS was higher in the BD II group (12.45 ± 5.91) than in the BD I group (11.25 ± 6.97), though the effect size was small ($p=0.04$, Cohen's $d=0.189$). 41.2% of the BD I group and 51.3% of the BD II group had SAD ($\chi^2=5.05$, $p=0.03$). When combining SAD