



The relationship between morningness-eveningness and resilience in mood disorder patients



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ABSTRACT

Background: There is some evidence that resilience is related to mental illness. Patients with a mood disorder have a tendency to show eveningness, and they tend to be less resilient. However, no study has investigated the association between resilience and morningness-eveningness in patients with a mood disorder. The aim of this study was to explore whether morningness-eveningness is related to resilience in patients with a mood disorder.

Methods: We recruited 224 patients with major depressive disorder (MDD), 77 with bipolar disorder (BD), and 958 control participants. Morningness-eveningness and resilience were evaluated using the Composite Scale of Morningness (CS) and the Connor–Davidson Resilience Scale (CD-RISC), respectively.

Results: The CD-RISC scores were significantly lower in patients with MDD, followed by those with BD, than those of the control group. The CD-RISC score was positively correlated with the CS score in patients with MDD and BD. Multiple linear regression analyses revealed that the CS score was significantly associated with the CD-RISC score after controlling for the possible influence of age, gender, length of education, economic status, onset age, and suicide attempt history in the MDD group. However, the association did not reach statistical significance in patients with BD.

Conclusions: Higher resilience was positively correlated with morningness in patients with MDD or BD. In multiple regression analysis, a significant linear relationship was observed between resilience and morningness only in patients with MDD. The biological mechanism underlying the relationship between morningness-eveningness and resilience should be explored.

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1. Introduction

People encounter adversity in their life and stressful situations produce negative emotions. The ability to adapt well in the face of adversity, trauma, or stressful events is called resilience [1]. A low level of resilience is related to being more prone to pathological reactions to adverse environmental events, while a high level of resilience confers protection against them [2]. Resilience is affected by interactions among multiple genetic, developmental, neurobiological, and psychosocial factors [3]. Risk factors, such as chronic illness, poverty, and childhood

abuse, cause emotional problems, and negatively affect resilience. Protective factors, such as problem-solving ability, optimism, self-efficacy, empathy, and positive social relationships, increase resilience [4–6]. Resilience is affected by the hypothalamic-pituitary-adrenal axis, neurotransmission, neuronal connectivity, and serotonergic circuits [7]. Genetic studies have reported that moderation by the corticotropin-releasing hormone receptor gene and variations in the serotonin transporter gene promoter influence the risk of depression on exposure to stressful life events [8–10].

Some evidence indicates that resilience is related to psychiatric symptoms. High resilience levels are associated with less severe anxiety and depressive symptoms, even in people at high risk for psychosis [11]. High levels of resilience are related to fewer depressive episodes in patients with bipolar disorder (BD) [12], and low levels of resilience are

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related to a higher number of depressive episodes [13]. Resilience also moderates the risk of depressive symptoms in suicidal patients with depression and contributes to reduced incidence of suicidal ideation [14]. Thus, resilience seems to act as a protective factor against the symptoms of mood disorders.

Morningness/eveningness is related to individual differences in circadian rhythms and is classified as morning preference or evening preference [15,16]. Numerous studies have been conducted on the relationships between morningness/eveningness and mental health problems [17–20], and specific features of morningness/eveningness have been studied in patients with mood disorders. Depression is associated with delays in circadian rhythms, and patients with major depressive disorder (MDD) show greater eveningness than control subjects [21,22]. Patients with BD also reported more eveningness than control subjects [23,24]. Patients with bipolar disorder type II (BD2) show more eveningness than those with bipolar disorder type I (BD1), and those with recurrent MDD show less morningness than those with BD1 [25]. Patients with a mood disorder who have an evening preference have more severely disrupted circadian rhythms [26].

However, the mechanism underlying the connection between morningness–eveningness and mood disorders is unclear. Several studies have shown that eveningness is associated with depression independent of sleep [27–29]. Depression-specific vulnerability factors are related to eveningness, even after controlling for insomnia and neuroticism [30,31]. The association between resilience and morningness–eveningness was recently evaluated in healthy Spanish adults [32] and Korean college students [33]; evening-type people had lower resilience than morning-type people. Morningness is related to a higher level of resilience and less depressive symptoms in hospital employees [34]. A relationship between greater eveningness and reduced resilience has been postulated, which may in turn confer vulnerability to a mood disorder. Therefore, it is important to understand the relationship between morningness–eveningness and resilience in patients with a mood disorder.

In this study, we investigated the relationship between morningness–eveningness and resilience in patients with a mood disorder. Additionally, we evaluated the associations between resilience and clinical features in patients with a mood disorder. We hypothesized that morningness would be related to greater resilience in these patients.

2. Methods

2.1. Subjects

We recruited 224 patients with MDD, 77 patients with BD, and 958 control participants. The MDD group was composed of 111 (49.6%) patients with a single episode of MDD and 113 (50.4%) patients with recurrent MDD. The BD group consisted of 52 (67.5%) patients with BD1 and 25 (32.5%) patients with BD2. We recruited these patients from the outpatient psychiatric clinic of Eulji General Hospital and several psychiatric clinics in Seoul, Korea. Each patient was diagnosed based on criteria in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition through consensus by at least two psychiatrists, who reviewed each patient's medical records and used psychiatric interview data collected by a research nurse to obtain additional information. The psychiatrists reached a consensus by discussion until the final diagnosis was agreed upon. Exclusion criteria included intellectual disability, substance use disorder, organic mood disorder, and mood disorder due to another medical condition. The control group consisted mostly of college students (40.8%), nurses (36.1%), and public officers (22.7%), who were recruited using convenience sampling after a brief psychiatric interview. The control subjects were excluded if they reported a history of a psychotic disorder, mood disorder, anxiety disorder, substance use disorder, brain trauma, or intellectual disability. All participants in

this study were informed of the purpose and methods of the study. Written informed consent was obtained from each participant prior to enrollment. The ethics committee of Eulji General Hospital approved the study protocol.

2.2. Measurement

2.2.1. Morningness–eveningness

We assessed morningness–eveningness by evaluating the results of morningness/eveningness questionnaires [35]. The Composite Scale of Morningness (CS) is a 13-item self-reported questionnaire to determine morningness–eveningness [36]. The CS has acceptable psychometric properties [37,38]. The Korean version of the CS also shows psychometric reliability [39,40]. Three items on the CS are rated on a 5-point Likert scale, and the remaining ten items are rated on a 4-point Likert scale. Higher scores correspond to greater morningness. Participants were classified as morning type (score: 41–55), intermediate type (score: 28–40), or evening type (score: 13–27) [39]. The reliability of the CS was examined in terms of internal consistency by Cronbach's alpha coefficient, the value of which was 0.846.

2.2.2. Resilience

Resilience was evaluated using the Connor-Davidson Resilience Scale (CD-RISC), which is a 25-item self-report questionnaire. Each item is scored from 0 to 4 on a 5-point Likert scale, with higher scores reflecting higher resilience [41]. The CD-RISC has been validated for use in patients with post-traumatic stress disorder [42] and depressive disorder [43]. A Korean version of the CD-RISC has been validated and showed good reliability [44,45]. Items on the scale include: ability to adapt to change, tends to bounce back after illness or hardship, and can handle unpleasant feelings. The reliability of the CD-RISC was examined in terms of internal consistency by Cronbach's alpha coefficient, the value of which was 0.928.

2.3. Statistical analysis

Analysis of variance (ANOVA) was used to compare the sociodemographic and clinical characteristics of the MDD, BD, and control groups. Post-hoc comparisons were performed with Bonferroni's method. According to the CS score, participants in each diagnostic group were classified into morning type, intermediate type, or evening type. The three circadian types were compared in terms of demographic and clinical variables using ANOVA, and post-hoc comparisons were also performed with Bonferroni's method. Analysis of covariance (ANCOVA) was conducted to control for the effects of age, gender, economic status, and length of education, which showed significant differences among the MDD, BD, and control groups in the comparison of CD-RISC and CS scores. Estimated marginal means were obtained by adjusting for the covariates. Post-hoc comparisons were performed with Bonferroni's method. Pearson's correlation analyses were performed to investigate the correlation between CD-RISC scores and the demographic and clinical data of each diagnostic group. Simple regression analyses were performed to investigate the association between CD-RISC score and dummy variables, such as gender and suicide attempt history. We conducted a multiple regression analysis in each diagnostic group using the CD-RISC score as a criterion variable, including sociodemographic variables that were significant in the correlation and simple regression analyses ($p < 0.05$) together with age and gender as predictor variables. Significant clinical variables for the MDD or BD group in the correlation and simple regression analyses ($p < 0.05$) were additionally included as predictor variables. All analyses were performed using SPSS software (ver. 22.0; IBM Corp., Armonk, NY, USA). A p -value < 0.05 was considered significant.

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