ASSOCIATIONS BETWEEN CIRCADIAN RHYTHMS AND DAILY, SELF-REPORTED MOOD STATES IN BIPOLAR I DISORDER

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BACKGROUND

Chronobiological disturbances are a hallmark of bipolar disorder [1]. We previously conducted a variable cluster analysis to ascertain how mood states are associated with seventeen chronobiological traits in bipolar I disorder (BDI) [2]. The findings demonstrated that Young Mania Rating Scales (YMRS) scores were negatively correlated with interdaily stability (IS), relative amplitude (RA), goodness-of-fit (GOF), circadian quotient (CQ), 24-hour correlation, and the 5-Item Social Rhythm Metric (SRM-5) and positively correlated with Pittsburgh Sleep Quality Index (PSQI). The 30-Item Inventory of Depressive Symptomatology (IDS-30-C) was positively associated with PSQI. After correcting for possible false discovery rate, YMRS remained significantly associated with IS, RA, CQ with a trend toward significance with PSQI. IDS-30-C remained associated with PSQI. In this study we sought to determine how well self-reported mood state assessments correlated with clinician-rated assessments of mood state correlated and to attempt to replicate the findings of our previous study using participant self-reported mood state.

METHODS

The protocol was a 1-week, naturalistic, ambulatory study designed to determine the relationships between chronobiological characteristics and mood state in BDI. The study included 83 BDI participants. The diagnosis of BDI was confirmed using either the Structured Clinical Interview for DSM-IV Axis I Disorders or Mini International Neuropsychiatric Interview. Participants were excluded if they presented with uncontrolled medical conditions or lifestyle factors that could impact chronobiology, current use of hypnotic agents for sleep, or a history of substance abuse or dependence one month prior to study participation. Subjects completed daily mood life charts to assess the severity of mania and depression based on a 4-point system (0 = no symptoms; 1 = mild symptoms; 2 = moderate symptoms; 3 = severe symptoms) over the course of the observational period. Actigraphy was used to calculate IS, RA, GOF, CQ, and 24-hour correlation. The PSQI was used to estimate subjective sleep quality. The SRM-5 was used to assess for the degree of lifestyle regularity. Spearman's correlation was conducted to determine the correlations between the weekly-averaged, self-reported ratings of mania and depression and YMRS and IDS-30-C scores, respectively. Spearman's correlations were also used to determine the relationships between weekly-averaged, self-reported ratings of mania and depression and chronobiological characteristics. Benjamini-Hochberg Procedure was used to correct for false positive probability.

RESULTS

Age, years *M*(*SD*)	41.87 (11.53)
Gender	
Male	29 (35.4%)
Female	53 (64.6%)
Race	
Black	11 (13.4%)
White	43 (52.4%)
Hispanic	28 (34.2%)
Psychiatric Medications	
Lithium	15 (18.3%)
Anticonvulsants	43 (52.4%)
Mood Stabilizer	40 (48.8%)
Antipsychotics	44 (53.7%)
Antidepressants	38 (46.3%)
Benzodiazepines	21 (25.6%)
Medication free	10 (12.3%)
Chronobiological Measures *M*(*SD*)	
Interdaily Stability	.51 (.14)
Relative Amplitude	.79 (.13)
Goodness-of-Fit	.45 (.12)
Circadian Quotient	.74 (.16)
24-Hour Correlation	.23 (.11)
5-Item Social Rhythm Metric	3.80 (1.37)
Pittsburgh Sleep Quality Index	10.42 (3.84)
Self-Report Measures *M*(*SD*)	
Mania	.75 (.71)
Depression	.75 (.75)

Table 1. Sample Characteristics. Table 1 summarizes the sample characteristics. This includes demographic information, clinical characteristics, and chronobiological measurements. Mean (M) and standard deviation (SD) were used to describe quantitative variables. Frequencies and percentages were used to summarize categorical variables.

	Averaged, Weekly, Self-Reported Mania	Averaged, Weekly, Self-Reported Depression
Interdaily Stability	ρ = -0.248 p = 0.028*	ρ = -0.129 p = 0.256
Relative Amplitude	ρ = -0.298 p = 0.008*	ρ = -0.098 p = 0.390
Circadian Quotient	ρ = -0.340 p = 0.002*	ρ = -0.033 p = 0.776
Goodness-of-fit	ρ = -0.288 p = 0.010*	ρ = -0.023 p = 0.841
24-Hour Correlation	ρ = -0.274 p = 0.0145*	ρ = 0.023 p = 0.841
5-Item Social Rhythm Metric	ρ = -0.288 p = 0.010*	ρ = -0.145 p = 0.203
Pittsburgh Sleep Quality Index	ρ = 0.270 p = 0.016*	ρ = 0.289 p = 0.010*

Table 2. Correlations between self-reported assessments of manic and severity and chronobiological variables. Table 2 summarizes the relationships between the weekly-averaged, self-reported ratings of mania and depression and chronobiological characteristics. * denotes statistical significance. ρ denotes Spearman's correlation coefficient.

RESULTS

There was a significant positive correlation between the weekly-averaged, self-reported ratings of mania and YMRS scores ($r = 0.291$, $p = 0.008$) and between the weekly-averaged, self-reported ratings of depression and IDS-30-C scores ($r = 0.451$, $p < 0.001$). The weekly-averaged, self-reported ratings of mania was significantly negatively correlated with IS ($r = -0.252$, $p = 0.022$), RA ($r = -0.296$, $p = 0.009$), CQ ($r = -0.368$, $p = 0.001$), GOF ($r = -.293$, $p = .008$), 24-hour correlation ($r = -0.292$, $p = 0.008$) and SRM-5 ($r = -0.315$, $p = 0.005$) and positively correlated with the PSQI ($r = 0.244$, $p = 0.027$). The weekly-averaged, self-reported ratings of depression was positively associated with PSQI ($r = 0.289$, $p = 0.010$). All results remained statistically significant after correcting for the false discovery rate.

CONCLUSIONS

The results of our study demonstrate that BDI participants were able to accurately assess their mood state as demonstrated by the significant correlations between averaged, weekly, averaged, self-reported mood state and clinician-rated mood scales. In addition, we were able to replicate the findings from our previous study showing correlations between mood state and specific chronobiological characteristics. The present study supports the use of self-reported mood states for future longitudinal chronobiology studies in BDI.

REFERENCES

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