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Comparison of novel oxidative stress and systemic inflammation marker levels in patients with bipolar disorder and schizophrenia

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Dear Editor,

Bipolar disorder (BD) and schizophrenia (SCZ) are chronic mental disorders with mood and psychotic episodes, respectively, which significantly affect functioning and quality of life. The pathophysiology of both BD and SCZ is still poorly understood; however, accumulating evidence indicates the role of aberrant immune-inflammatory processes.[1] The pathophysiological mechanisms of SCZ and BD require further investigation. It is vital to develop a validated methodology that searches for cheap and easily accessible biomarkers and results in an accurate diagnosis.[2] A better understanding of the pathophysiology of these chronic mental illnesses is crucial for the discovery of new targets that may lead to better outcomes in their treatment.[3]

Studies on inflammation in BD and SCZ have generally been performed using cytokines, chemokines or other oxidative stress markers. However, many inflammation-related biomarkers are expensive and have limited use in clinical practice. Therefore, combined biomarkers based on routine peripheral blood cell tests, including neutrophil/high-density lipoprotein (HDL) ratio (NHR), lymphocyte/HDL ratio (LHR), monocyte/HDL (MHR) ratio, platelet/HDL ratio (PHR), atherogenic index of plasma (AIP; logarithmically transformed ratio of triglyceride to HDL molar concentrations), and atherogenic coefficient (AC; non-HDL/HDL), have received increasing attention for identifying simple, inexpensive, and routinely obtained biomarkers of systemic inflammation and oxidative stress.[4] A few recent studies have evaluated MHR, NHR, LHR, PHR, AIP, and AC levels in patients with BD and SCZ.[2,4-6] This study aimed to examine whether the levels of these markers differed in patients with acute mood (BD) or psychotic episodes (SCZ), after adjusting for confounding factors.

The first blood tests of patients with BD-mania (BD-M, n=52), BD-depression (BD-D, n=51), and SCZ (n=61) hospitalized in the psychiatry department of Çanakkale Onsekiz Mart University Hospital were analyzed retrospectively. The sociodemographic and clinical characteristics of the patients are shown in Table 1. Sociodemographic and clinical characteristics did not differ between the groups (p<0.05), except for sex (p=0.03) and number of hospitalizations (p=0.044).

Table 1. Sociodemographic and clinical characteristics of the patients

Characteristics	BD-M (n=52)	BD-D (n=51)	SCZ (n=61)	p-value
Age (years)	40.9±13.1	44.9±11	42.4±13.2	.282
Gender (female)	36 (69.2%)	34 (66.7%)	25 (41%)	.003*
Age at disorder onset (years)	30.4±14	31.3±11.9	31.7±13	.505
Marital status (married)	26 (50%)	29 (56.9%)	21 (34.4%)	.083
Occupation (employed)	18 (34.6%)	22 (43.1%)	19 (31.1%)	.408
Duration of disorder (years)	9.7±9.1	12.9±9.5	9.4±10.8	.139
Number of hospitalisation	2.54±1.9	3±2	2.1±1.8	.044*
Having comorbidity	24 (46.2%)	27 (52.9%)	21 (34.4%)	.156
Active smoking	25 (48.1%)	24 (47.1%)	38 (62.3%)	.205

Note: Plus-minus values are given as mean±standard deviation. * significant p-value. BD-M: Bipolar disorder, mania; BD-D: Bipolar disorder, depression; SCZ: schizophrenia.

Analyses of covariance (ANCOVA) were performed by controlling for age, sex, presence of medical disease, and active smoking to examine whether there was a difference in inflammatory ratios between the groups. Table 2 presents the results. When controlling for confounding factors, there was no difference in any inflammatory ratio among the three groups (all p<0.05).

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Table 2. ANCOVA results of inflammatory ratios among groups

	BD-M (n=52)	BD-D (n=51)	SCZ (n=61)		
Inflammatory ratios	Estimated marginal means±standard error			F	p
MHR	0.12±0.001	0.12±0.001	0.12±0.001	.192	.825
LHR	0.056±0.004	0.055±0.004	0.051±0.004	.42	.658
NHR	9.385±0.498	9.335±0.504	9.417±0.482	.007	.993
PHR	6.074±0.37	5.646±4.895	5.665±0.344	.43	.651
AIP	0.439±0.042	0.486±0.042	0.396±0.039	1.156	.318
AC	2.993±0.195	3.334±0.205	2.774±0.175	2.083	.129

Note: ANCOVA: analyses of covariance; MHR: monocyte/HDL ratio; LHR: lymphocyte/HDL ratio; NHR: neutrophil/HDL ratio; PHR: platelet/HDL ratio; AIP: atherogenic index of plasma; AC: atherogenic coefficient.

In this study, new inflammatory ratios such as MHR, LHR, NHR, PHR, AIP, and AC did not differ between acute mood episodes in patients with BD and acute psychotic episodes in SCZ. In previous studies in patients with BD or SCZ, these inflammatory ratios were compared with those in healthy controls, and significant differences were usually found.[2,4,5] This suggests that these inflammatory ratios were not predictors for differentiating SCZ patients from BD in acute episodes. These biomarkers may be peripheral trait biomarkers that reflect the enhanced inflammatory signaling in SCZ, BD-M, and BD-D. Longitudinal studies with a larger sample size comparing BD and SCZ patients with healthy controls will increase our knowledge of this subject.

ETHICAL DECLARATIONS

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Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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