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# The relationship between impulsivity and lipid levels in bipolar patients: does temperament explain it?

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**Abstract**

**Background:** The aim of this study was to investigate whether there was a relationship between impulsivity and lipid levels in patients with bipolar disorder (BD) and to examine the correlation of impulsivity and lipid levels with temperament subtypes.
**Methods:** For this purpose, one hundred patients who were admitted to our out-patient unit for routine controls, had been in remission for at least 8 weeks, and diagnosed as BD according to the DSM-IV were evaluated consecutively. Impulsivity and temperament were evaluated with the BIS-11 and the TEMPS-A. Blood samples were obtained to measure levels of lipids (cholesterol, triglyceride, high density lipoprotein-HDL, low density lipoprotein-LDL).
**Results:** A weak correlation was found between impulsivity scores and triglyceride levels ($r = 0.190$, $p = 0.050$). Correlation was found between impulsivity scores and depressive, anxious, cyclothymic, and irritable temperaments ($r = 0.371$, $p < 0.001$; $r = 0.458$, $p < 0.001$; $r = 0.541$, $p < 0.001$; $r = 0.530$, $p < 0.001$), while triglyceride levels were only related with depressive and anxious temperaments ($r = 0.485$, $p = 0.001$ and $r = 0.391$, $p = 0.006$).
**Conclusions:** Temperament is an important mediator of the relationship between lipid levels and trait impulsivity in patients with BD.


## 1. Introduction

Moeller et al. (2001) defined the relationship between impulsivity and bipolar disorder (BD) with five factors: Related to pathophysiology of illness, related to susceptibility, related to episodes of illness or to prodromes of episodes, related to risk of complications and related to response to treatment [1]. Higher levels of impulsivity were found in both episodes and remission periods of BD compared to the levels in healthy subjects [2]. Although impulsive behavior was defined to be specific to manic episode by some researchers [3], impulsivity was observed clinically in both unipolar and bipolar depressive patients. Temperamental differences were thought to be the reason for this observation, which is more evident in some cases.

Garland et al. (2007) stated that there was an association between serum cholesterol levels and impulsivity and emphasized that the association between low cholesterol levels and impulsive behavior was related to serotonergic activity [4]. This association between impulsivity and lipid levels was mostly investigated in suicidal samples [5,6]. However, the number of studies investigating the relationship between impulsivity and lipid levels in BD patients is limited. No differences were found between cholesterol, triglyceride, high density lipoprotein (HDL), low density lipoprotein (LDL) levels in BD patients with or without suicide attempts, and in patients with violent or non-violent suicide attempts [7]. In an interesting study, Ghaemi et al. (2000) found lower levels of HDL in BD patients than in healthy subjects in all seasons except in winter, and based on these results and the fact that manic episodes are more prevalent in seasons other than winter, they suggested that impulsivity may be associated with low HDL levels [8].

The aim of this study was to investigate whether there was a relationship between impulsivity and lipid levels in BD and to investigate the correlation of impulsivity and lipid levels with temperament subtypes. Our hypothesis has proposed that the relationship between impulsivity and lipid levels depends on the association of both variables with temperament.

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## 2. Methods

### 2.1. Sample

One hundred patients who were admitted to our outpatient unit for routine controls, had been in remission for at least 8 weeks and diagnosed as Bipolar Disorder according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) were evaluated consecutively. Their written informed consents were obtained before the study. All the subjects were treated with lithium or/and anticonvulsants. As antipsychotics increase the risk for dyslipidemia [9], the patients who use antipsychotic medication were excluded. Subjects with diabetes mellitus, hypertension, cardiovascular disease, chronic inflammatory disease, hyperuricemia and other Axis I disorders and/or severe or unstable medical illnesses were excluded. All the subjects were medically healthy, as determined by physical and neurological examination and laboratory tests. All the subjects were given a well balanced diet for at least one month.

### 2.2. Measurements

#### 2.2.1. Structured Clinical Interview for DSM-Axis I Disorders (SCID-I)

It is a semi-structured clinical interview developed by First et al. [10].The reliability and validity study of the Turkish version of this interview was carried out by Özkürkçügil et al. [11].

#### 2.2.2. Barratt Impulsivity Scale 11th version (BIS-11)

It is a self-rated scale with 30 items developed by Barratt et al. to measure impulsivity [12]. Its reliability and validity study in Turkish was carried out by Güleç et al. [13].

#### 2.2.3. TEMPS-A Temperament Scale

TEMPS-A Temperament Scale was developed by Akiskal to evaluate the affective temperament [14]. The reliability and validity study for the Turkish form was done by Vahip et al. [15].

### 2.3. Procedure

The required permission to conduct the study was taken from the local ethics commission of Erenköy Psychiatry Education and Research Hospital. Diagnostic interviews were done for every patient with SCID-I and then, impulsivity was evaluated by using the Barratt Impulsivity Scale-11, while affective temperament was evaluated with the TEMPS-A. Blood samples were obtained using vacutainer tubes to determine levels of lipids (cholesterol, triglyceride, high density lipoprotein-HDL, low density lipoprotein-LDL), which were measured in mg/dl.

### 2.4. Statistical analysis

Group comparisons of demographic variables used ANOVAs for continuous measures. Levene's test was used to examine homogeneity of variance; Shapiro-Wilk's test was used to examine normality for lipid levels. Variables with any assumption violations were log transformed. However, log transforming variables did not alter significance for any results. In correlation analysis, Pearson correlation test was used. Results were considered significant at $p < 0.05$, two tailed.

## 3. Results

### 3.1. Sample

Fifty-two female and 48 male, total of 100 BD patients with a mean age of 38.4 ± 10.6 years were included. The average age of male and female subjects were similar ($t = 0.8$, $p = 0.652$).

### 3.2. Relation between impulsivity scores and lipid levels in patients with BD

A weak correlation was found between triglyceride levels and impulsivity scores ($r = 0.190$, $p = 0.050$) (Table 1).

### 3.3. Relation between impulsivity and temperament scores in patients with BD

Correlation was found between impulsivity scores and depressive, anxious, cyclothymic and irritable temperaments (respectively, $r = 0.371$, $p < 0.001$; $r = 0.458$, $p < 0.001$; $r = 0.541$, $p < 0.001$; $r = 0.530$, $p < 0.001$). There was no correlations between impulsivity scores and hyperthymic temperament scores (Table 2).

### 3.4. Relation between temperament scores and serum lipids in patients with BD

An inverse correlation was found between triglyceride levels and depressive and anxious temperament scores ($r = 0.485$, $p = 0.001$ and $r = 0.391$, $p = 0.006$), (Table 3).

## 4. Discussion

In our study, a relationship between impulsivity and lipid levels was shown only for Tg levels in BD patients.

Table 1
Relationship between lipid levels and impulsivity scores.

| | Impulsivity |
|---|---|
| Cholesterol | r = −.111 |
| | p = .442 |
| Tg | r = .190 |
| | p = .050 |
| LDL | r = −.068 |
| | p = .663 |
| HDL | r = .053 |
| | p = .744 |

Tg: Triglyceride, LDL: Low density lipoprotein, HDL: High density lipoprotein.