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*Source / Izvornik:* **Collegium Antropologicum, 2009, 33, 7 - 10**

**Journal article, Published version**

**Rad u časopisu, Objavljena verzija rada (izdavačev PDF)**

*Permanent link / Trajna poveznica:* <https://urn.nsk.hr/urn:nbn:hr:105:245795>

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*Download date / Datum preuzimanja:* **2024-09-30**



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# Metabolic Syndrome, Anxiety, Depression and Suicidal Tendencies in Post-Traumatic Stress Disorder and Schizophrenic Patients

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## ABSTRACT

*Persons with schizophrenia and post-traumatic stress disorder (PTSD) tend to have higher psychiatric and somatic morbidity. They typically have higher rates of substances abuse (including smoking), more prevalent obesity, diabetes mellitus, and cardiovascular disease (CVD). This is especially well seen in case of the metabolic syndrome, with a number of published studies on psychiatric patients in the last few years. This study investigated the associations between metabolic syndrome, anxiety, depression and suicidal tendency in schizophrenic and combat-related PTSD patients controlled by healthy controls. Higher rates of anxiety, depression and recent life changes scores in participants with metabolic syndrome were recorded compared to those without metabolic syndrome. Suicidal tendencies were equally present in both groups.*

**Key words:** *metabolic syndrome, schizophrenia, post-traumatic stress disorder, anxiety, depression, suicidal tendency, lipids, hypertension*

## Introduction

Persons with schizophrenia and PTSD tend to have higher morbidity. They typically have high rates substance abuse (including smoking), obesity, diabetes mellitus, and cardiovascular disease (CVD)<sup>1</sup>. Studies have shown that schizophrenic patients have a 50% to 300% increased risk of death due to medical causes<sup>2,3</sup>. There are only few reports about metabolic syndrome in PTSD patients. In our earlier study<sup>4</sup> we have found that metabolic syndrome (MetSy) was significantly higher in schizophrenic patients compared to healthy controls and there were no differences between schizophrenic and PTSD patients. We have also investigated metabolic syndrome and depression in war veterans with post-traumatic stress disorder<sup>5</sup>. Suicidal attempts and suicide are complications in some schizophrenic and PTSD patients. Earlier papers of our team pointed out the role of lower cholesterol in the context of suicidal tendency for patients of different diagnostic groups of psychotic patients<sup>6–10</sup> and some parameters of suicidal behavior in combat related PTSD patients<sup>11</sup>. This study investigated

association between metabolic syndrome, anxiety, depression and suicidal tendency in schizophrenic and combat-related PTSD patients controlled by healthy controls.

## Materials and Methods

### *Subjects*

Our investigation included 450 participants. The group of schizophrenic patients (n=205) comprised of 108 patients treated at the Department of Psychiatry, Clinical Hospital Mostar and 97 patients treated in ambulatory setting. The control group included PTSD patients (n=140) and healthy controls (n=140). The controls were matched for age and gender.

### *Clinical evaluations*

The diagnosis of schizophrenia and PTSD was made according to diagnostic criteria of the International Statistical Classification of Diseases and Related Health

Problems<sup>12</sup>. The diagnosis of the metabolic syndrome was made according to ATP-III criteria. Clinical evaluation was performed by the trained psychiatrists. Anxiety was assessed by Hamilton anxiety scale and depression was assessed by Hamilton depression scale.

*Ethics*

All subjects gave written informed consent to participate in the study. This study was approved by the Medical Ethics Committee. The exclusion criteria were diagnosis of substance abuse and alcoholism.

*Biochemical measurements*

Blood samples were collected from all subjects at 8.30 a.m. after an overnight fasting, and serum concentration of lipids was determined by enzyme analysis, immediately after the blood collection. The assays were done using commercial kits (Olympus Diagnostic GmbH, Hamburg, Germany) on Olympus AU 600 automatic analyzer.

*Statistical analysis*

The results were expressed as mean values and standard deviations. Student t-test was used to compare two groups after normal data distribution in some variables had been demonstrated by Kolmogorov-Smirnov test. The differences in the non-parametric variables between groups were assessed using  $\chi^2$ -test. In all tests, the criterion of significance was  $p < 0.05$ . Statistical analysis of re-

sults was done by SPSS 11 (SPSS for Windows 11.0, SPSS, Chicago, IL, USA).

**Results**

The results have been shown in the form of the few tables. The scores on Ham-D, Ham-A and RLCQ were significantly higher in participants with metabolic syndrome compared to those without metabolic syndrome (t-test;  $p < 0.001$ ; Table 1). RLCQ score was significantly higher in schizophrenic patients with metabolic syndrome (646.74±238.76) compared to schizophrenic patients without metabolic syndrome (494.52±165.86) (t-test;  $p < 0.001$ ). In the group of healthy controls, the scores on Ham-D, Ham-A and RLCQ were significantly higher in participants with metabolic syndrome compared to those without metabolic syndrome (t-test;  $p < 0.001$ ). RLCQ score was significantly higher in PTSD patients with metabolic syndrome (526.85±144.48), compared to PTSD patients without metabolic syndrome (439.43±104.91) ( $p < 0.001$ ). There was no significant difference in history of suicide attempt between schizophrenic patients with metabolic syndrome compared to those without ( $\chi^2 = 0.019$ ;  $p = 0.890$ ). Metabolic syndrome was significantly more presented in PTSD patients with suicide attempt (20.0%), compared to PTSD patients without suicide attempt (7.7%), ( $p < 0.01$ ). There were no significant differences in suicide attempts and frequency of some components of metabolic syndrome in schizo-

**TABLE 1**  
DIFFERENCES IN HAM D, HAM A AND RLCQ TEST BETWEEN PARTICIPANTS WITH AND WITHOUT METABOLIC SYNDROME

Scale	$\bar{X} \pm SD$		T	p*
	Without MetSy	With MetSy		
Ham-D	7.44±6.24	10.44±7.27	4.56	<0.001
Ham-A	5.49±3.93	6.94±4.05	3.78	<0.001
RLCQ	451.20±143.93	583.30±208.31	7.47	<0.001

**TABLE 2**  
INFLUENCE OF DEPRESSION, ANXIETY AND STRESS ON INCIDENCE OF METABOLIC SYNDROME IN SCHIZOPHRENIC, PTSD PATIENTS AND HEALTHY CONTROLS

Group	Scale	$\bar{X} \pm SD$		t	P
		Without MetSy	With MetSy		
Schizophrenia	Ham D	11.36±6.86	13.18±7.91	1.76	0.080
	Ham A	8.00±4.32	8.55±4.42	0.89	0.372
	RLCQ	494.52±165.86	646.74±238.76	5.25	<0.001
Healthy controls	Ham D	3.04±1.92	5.65±2.18	6.97	<0.001
	Ham A	2.66±1.61	4.10±1.23	5.09	<0.001
	RLCQ	411.13±124.61	497.20±133.07	3.62	<0.001
PTSD	Ham D	7.72±4.77	8.90±6.15	1.10	0.273
	Ham A	5.72±2.45	6.04±3.17	0.59	0.559
	RLCQ	439.43±104.91	526.85±144.48	3.49	<0.001

**TABLE 3**  
FREQUENCY OF METABOLIC SYNDROME COMPARED TO SUICIDAL ATTEMPT IN SCHIZOPHRENIC AND PTSD PATIENTS

Group	Suicide attempt	Diagnosis of MetSy		Total N (%)
		No	Yes	
		N (%)	N (%)	
Schizophrenia	Total	111 (100.0)	94 (100.0)	205 (100.0)
	Yes	40 (36.0)	33 (35.1)	73 (100.0)
	No	71 (64.0)	61 (64.9)	132 (100.0)
PTSD	Total	65 (100.0)	40 (100.0)	105 (100.0)
	Yes	5 (7.7)	8 (20.0)	13 (100.0)
	No	60 (92.3)	32 (80.0)	92 (100.0)

**TABLE 4**  
SUICIDAL ATTEMPTS IN SCHIZOPHRENIC AND PTSD PATIENTS COMPARED TO FREQUENCY OF METABOLIC SYNDROME COMPONENTS

Group	Components of MetSy	Suicide attempt		$\chi^2$	p
		No	Yes		
		N (%)	N (%)		
Schizophrenia	Abdominal obesity	72 (80.0)	20 (17.4)	0.23	0.633
	Hypertension	96 (83.5)	19 (16.5)	0.70	0.401
	Hyperglycaemia	57 (85.1)	10 (14.9)	0.86	0.354
	Hypertriglyceridaemia	94 (81.7)	21 (18.3)	0.01	0.909
	Low HDL	44 (75.9)	14 (24.1)	1.68	0.195
PTSD	Abdominal obesity	57 (90.5)	6 (9.5)	0.19	0.665
	Hypertension	56 (93.3)	4 (6.7)	2.29	0.130
	Hyperglycaemia	31 (88.6)	4 (11.4)	0.04	0.841
	Hypertriglyceridaemia	46 (90.2)	5 (9.8)	0.06	0.801
	Low HDL	23 (88.5)	3 (11.5)	0.03	0.854

phrenic and PTSD patients. Schizophrenic and PTSD patients with hypertriglyceridaemia and low HDL made frequently suicide attempts.

## Discussion

The results of this study show that participants with metabolic syndrome have significantly higher anxiety, depression and recent life changes than those without metabolic syndrome. After divided participants in the three groups (schizophrenic patients, PTSD patients and healthy controls) we have found that recent life changes score was significantly higher in all of groups with metabolic syndrome but anxiety and depression scores were significantly higher only in healthy controls with metabolic syndrome (comparing to those without metabolic syndrome) but no in the groups of schizophrenic and PTSD patients. Although, schizophrenic and PTSD patients with metabolic syndrome have non-significantly higher scores of anxiety and depression compared to same groups without metabolic syndrome. It could mean that anxiety and depression may be a risk factor

for some unhealthy habits that lead to development of metabolic syndrome. It is hypothesized that a predisposition towards abdominal obesity places schizophrenia patients at risk for development of both type II DM and the metabolic syndrome<sup>13</sup>. There were no differences in suicidal attempts between schizophrenic patients with and without metabolic syndrome but there was a difference in PTSD patients. PTSD is multisystemic mental disorder with numerous psychiatric and somatic comorbidities<sup>14–16</sup>. PTSD patients with metabolic syndrome have significantly higher number of suicidal attempts than PTSD patients without metabolic syndrome. Possible explanation could be that metabolic syndrome can increase the level of severity disease in PTSD and suicidal behavior is one of tragic complications in this group of patients.

## Acknowledgements

This work was supported by Ministry of Science, Education and Sport from the Republic of Croatia, grant No: 0108106.

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## METABOLIČKI SINDROM, ANKSIOZNOST, DEPRESIJA I SUICIDALNOST KOD OBOLJELIH OD POSTTRAUMATSKOG STRESNOG POREMEĆAJA I SHIZOFRENIJE

### SAŽETAK

Oboljeli od shizofrenije i post-traumatskog stresnog poremećaja (PTSP) imaju značajan psihijatrijski i somatski komorbiditet. Obično imaju visoku učestalost ovisnosti (osobito pušenja), debljine, šećerne bolesti i kardiovaskularnih bolesti. Više je objavljenih radova zadnjih godina koji opisuju metabolički sindrom u psihijatrijskih bolesnika. Ovo istraživanje povezuje parametre metaboličkog sindroma, anksioznost, depresiju i suicidalnost, kod oboljelih od shizofrenije i PTSP-a, u usporedbi sa zdravim ispitanicima. Na ukupnom promatranom uzorku, pronađena je viša izraženost anksioznosti, depresije i nedavnih životnih promjena, kod ispitanika s metaboličkim sindromom u usporedbi s onima koji nemaju metabolički sindrom. Suicidalnost nije bila značajno različita između bolesnika s metaboličkim sindromom u usporedbi s onima koji nemaju metabolički sindrom.