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Posttraumatic Stress Disorder is a Risk Factor for Metabolic Syndrome in an Impoverished Urban Population

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Abstract

Objective—Metabolic syndrome is associated with elevated risk for cardiovascular disease and diabetes, and has increased prevalence in low-income African-Americans, which constitutes a significant health disparity. The mechanisms responsible for this disparity remain unclear; the current study investigated the relationship between Posttraumatic Stress Disorder (PTSD) and metabolic syndrome.

Method—We assessed childhood and adult trauma history, Major Depressive Disorder (MDD), PTSD, and the components of metabolic syndrome in an urban population. We recruited 245 low socio-economic status (SES), primarily African American subjects from general medical clinics in an inner-city hospital.

Results—Trauma exposure was extremely prevalent, with 90.6% of subjects reporting at least one significant trauma, and 18.8% of subjects meeting criteria for a current PTSD. Metabolic syndrome was also prevalent in this population (33.2%), with significantly higher rates among patients with current PTSD (47.8%, $p<.05$). After controlling for demographics, smoking history, antipsychotic use, depression, and exercise, current PTSD remained the only significant predictor of metabolic syndrome ($p=0.006$).

Conclusions—PTSD is associated with increased rates of metabolic syndrome within a traumatized, impoverished urban population. Further studies should investigate if PTSD treatment may reduce the rates of metabolic syndrome, improve overall health outcomes, and decrease healthcare disparities in minority populations.

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Keywords

Post-traumatic Stress Disorder; Depression; African-American; Minority; Trauma; Child Abuse; Childhood Maltreatment; Psychiatry

Introduction

The elements of metabolic syndrome, including hyperglycemia, obesity, hyperlipidemia, and hypertension, are among the leading risk factors for cardiovascular morbidity and mortality [1-5]. The increased prevalence of cardiovascular risk factors in African-Americans is well-established, but the mechanisms underlying this important health disparity are unclear [6-10]. Some investigators have found that socioeconomic status (SES) plays an important role in health disparity [11]. One possible explanation that has received little attention is that metabolic syndrome and cardiovascular risk factors develop as a result of high rates of trauma exposure in marginalized populations [12].

Previous studies have reported that many urban, low SES minority populations have extremely high rates of trauma exposure and are at elevated risk for Posttraumatic Stress Disorder (PTSD) [13-16]. Trauma exposure and PTSD are associated with higher rates of physical morbidity and mortality, as well as increased healthcare utilization and expenditures [17-20]. In addition, trauma exposure and/or a diagnosis of PTSD are associated with a variety of metabolic abnormalities [21-26] which may mediate these adverse health outcomes. For example, combat veterans and civilian police officers with a diagnosis of PTSD have been reported to have higher levels of serum lipids [26,27], as well as a higher rate of metabolic syndrome [18,20,23,25,26]. Similarly, elevated rates of diabetes and cardiovascular disease have been reported in civilians and combat veterans with PTSD [28,29]. In addition, an association has been demonstrated between a diagnosis of PTSD and the presence of metabolic syndrome in psychiatric outpatients receiving antipsychotic medications [24]. However, there are no published reports of the relationship between the presence of metabolic syndrome and diagnosis of PTSD in civilian, low SES, minority individuals in an inner city setting.

The high rates of trauma exposure and stress-related psychiatric disorders observed in at-risk low SES urban African-American populations [13,15] may also be associated with alterations in metabolic functioning that may partially account for observed health disparities within this population. Frequent activation of the body's stress response as a result of trauma and PTSD can cause a cumulative strain on the body. Previous studies have demonstrated that comprehensive measures of physiological function can be more predictive of cumulative biological risk than approaches that assess biological risk factors as individual parameters [30]. Therefore, we focused on the prevalence of metabolic syndrome, which is characterized by the presence of multiple metabolic risk factors in a given individual and is associated with increased risk for cardiovascular disease, diabetes, stroke, and multiple other medical sequellae. To further explore this hypothesis, we examined whether childhood and adult trauma history, as well as Major Depressive Disorder (MDD) and PTSD were associated with metabolic syndrome within individuals recruited from general medical clinic waiting rooms in an urban public hospital.

Methods

Recruitment and General Study Procedures

The data for this study were collected to investigate the effects of PTSD on metabolic function and were drawn from a larger sample of subjects enrolled in a study of risk factors

for PTSD in an urban, low-income, predominantly African-American population [15,31]. Individual subjects were recruited from waiting rooms in multiple primary care clinics at Grady Memorial Hospital, a publicly funded hospital primarily serving individuals of low SES in Atlanta, Georgia. Prospective subjects were invited to complete a screening interview, and a subset of subjects returned for additional study visits to participate in more in-depth psychiatric interviews and physiological assessments. Demographic data were ascertained through subject self-report. As part of the multi-day study, subjects underwent psychological assessments, a physical examination, a fasting morning blood draw, and morphometric measurements. To be eligible for participation, subjects had to be at least age 18 or older, provide informed consent, and be able to speak English. Subjects were excluded if they had active/unstable psychotic symptoms or prominent suicidal ideation at the time of the study, had dementia, were pregnant, or took oral corticosteroids within the past month. All other subjects for whom we collected metabolic data were included from the larger study. A detailed account of the general Grady Trauma Project study methods has been previously published and can be found in Gillespie et al[15]. The final sample size included 245 participants.

Trauma and Psychological Measures

Trauma History—The Traumatic Events Inventory (TEI) [15,31] is a 14-item instrument for assessing exposure to traumatic events in childhood and adulthood. For each traumatic life event, the TEI assesses experiencing and witnessing of events separately. In addition to assessing the presence and absence of each type of trauma exposure, the TEI also assesses frequency of exposure within each type of trauma. The TEI, which was developed for use with our specific study population, is similar in number of questions and format to other self report assessments of trauma exposure see e.g., [32] and see [33] for a review of self-report instruments of civilian trauma exposure.

PTSD—PTSD symptoms and PTSD diagnosis were assessed using the Clinician Administered PTSD Scale (CAPS) [37,38]. The CAPS is a structured interview with excellent psychometric properties [39], which provides a diagnosis of PTSD and can also be used as a continuous measure of PTSD symptomatology. A current (last 30 days) or lifetime diagnosis of PTSD was based on the presence/absence of each of the DSM-IV diagnostic criteria using a frequency rating of ≥1 paired with an intensity score of ≥ 2 as the scoring rule.

MDD—The Structured Clinical Interview for DSM-IV (SCID) [40] is a well-validated interview assessment for the diagnosis of clinical psychiatric disorders. Within the context of this study, the SCID was used to determine the presence or absence of current MDD.

Smoking and Substance Abuse—Lifetime history of smoking was assessed using responses from the Kreek-McHugh-Schluger-Kellogg scale. Current and lifetime substance abuse was determined based on SCID diagnosis of alcohol and drug abuse or dependence.

Physiologic Measures

Medical Evaluation and Laboratory Determinations—A study physician determined each subject's eligibility based on a medical examination performed by the study physician at the beginning of the study visit or based on review of records from a medical exam by a Grady physician completed within 2 months of study participation. Blood pressure, weight (kg), height (cm), and waist circumference (cm) were obtained by trained nursing staff at the Grady Hospital Clinical Research Center. Fasting blood samples were obtained by venipuncture between 0800 and 0900 during the baseline study assessment for each subject. Serum samples were obtained, processed, and then stored at −80° C for later processing in

batches. Triglyceride (TG) and glucose were measured by enzymatic methods using reagent kits from Beckman Coulter Diagnostics (Fullerton, CA). High Density Lipoprotein (HDL) was ascertained by homogenous enzymatic methods using kits from Equal Diagnostics (Exton, PA).

Prescribed medications from the hospital were recorded and used as covariates when needed. Antipsychotics were prescribed within a subset of the cohort (<30), and these included: risperidone, ziprasidone, quetiapine, aripiprazole, and paliperidone.

Definition of Metabolic Syndrome—Within the context of this study, metabolic syndrome was defined using a modified version of the Adult Treatment Panel (ATP) III guidelines [2,41]. ATP III guidelines have been widely used in the literature to assess metabolic syndrome in a wide range of racial and ethnic groups in the US and throughout the world, [42-45] and metabolic syndrome as defined by ATP III guidelines has been shown to predict cardiovascular disease and cerebrovascular disease in African American individuals [46].

Subjects who had at least 3 of the 5 risk characteristics were considered to have metabolic syndrome: 1) Fasting glucose ≥ 110 mg/dL , 2) Abdominal obesity based on a waist circumference of >102 cm for men or >88 cm for women, 3) Triglycerides ≥ 150 mg/dL, 4) HDL cholesterol <40 mg/dL for men or <50 mg/dL for women, and 5) Systolic blood pressure ≥ 130 or diastolic blood pressure ≥ 85 mmHg.

Statistical Analyses—We examined the relationship between PTSD, metabolic syndrome, and the individual components of metabolic syndrome by conducting chi square comparisons of the rate of metabolic syndrome in subjects with versus without current PTSD. Additionally, a logistic regression analysis was completed, examining metabolic syndrome as the outcome and current PTSD diagnosis as the predictor variable adjusting for age, sex, race, lifetime smoking history, current antipsychotic use, number and types of trauma exposure, and current diagnosis of MDD. We had full fasting data on all variables needed for establishing presence/absence of metabolic syndrome and PTSD for 245 subjects who were included in the chi-square, and 200 subjects for whom all variables were present for logistic regression analyses. We conducted secondary analyses to control for the effect of medications for diabetes, hypertension, and hyperlipidemia on any association between PTSD and metabolic syndrome.

Results

Patient Characteristics

The mean age of the study population was approximately 45 years, and was similar between those subjects with and without a current diagnosis of PTSD (Table 1). Although not statistically significant, the proportion of female subjects (69.6%) was higher in the group with a current diagnosis of PTSD versus those without that diagnosis (60.3%), reflecting the increased frequency of PTSD amongst women with a history of trauma exposure. As previously reported in this study population, race was primarily African-American (>89%) and did not differ between those subjects with and without PTSD [15]. At the time of the study, approximately 51% of subjects were unemployed with an additional 27% disabled. Unemployment and lower income were more frequent in the PTSD subjects compared to those without PTSD; however, these differences were not statistically significant.

Trauma and psychiatric diagnoses

Reported rates of trauma exposure were extremely high within this population. Of the 245 subjects examined for metabolic syndrome (Table 1) 90.6% reported a history of exposure to at least one, with an average of 3.7 criterion A traumatic events. Exposure to trauma during both childhood and adulthood was common, and those with a current diagnosis of PTSD tended to have higher rates compared to those without a current diagnosis of PTSD (42.5% vs. 30.6%, p=0.06). The most common traumas were serious accident or injury (59.5% of subjects), attack with a weapon by someone other than a domestic partner (39.4%), attack by a significant other without a weapon (36.6%), and witnessing domestic violence as a child (37.3%). Regarding childhood trauma exposure, 43.4% of subjects reported physical abuse, 34.0% reported a history of sexual abuse, and 44.6% reported emotional abuse.

Overall, 18.8% of subjects met DSM-IV diagnostic criteria for a current diagnosis of PTSD with the CAPS. Depression was also prominent in this study population, with 13.2% of subjects meeting diagnostic criteria for a current Major Depressive Disorder (MDD) with the SCID. As expected given the high prevalence of comorbid PTSD and MDD, a current diagnosis of MDD was significantly more common amongst those with a current diagnosis of PTSD (42.9%) versus those without a current diagnosis of PTSD (6.4%, $p < 0.001$).

Due to the previous evidence of an association between antipsychotic medications and metabolic syndrome[50], the rate of antipsychotic use was also examined in this population. However, there was no difference between the rate of prescribed antipsychotic use between those without a current diagnosis of PTSD (8.5%) versus those with PTSD (10.9%; $p = 0.62$).

The self-reported rate of current substance abuse was low (5.3%), and did not differ based upon presence or absence of PTSD diagnosis (p=0.14). However, far higher rates were endorsed for lifetime smoking (73.7% of the population), a known cardiovascular risk factor. There was no difference in lifetime history of smoking between those with versus those without a current diagnosis of PTSD (p=0.39).

Metabolic Syndrome and Components of Metabolic Syndrome

Metabolic syndrome was present at a high rate in this population as a whole, with 33.2% meeting criteria by the ATP III Guidelines. A greater proportion of those with a current diagnosis of PTSD (47.8%) met criteria for metabolic syndrome versus those without current PTSD (31.2%, $p < 0.05$; Table 2, Figure 1A). Notably, a lifetime diagnosis of PTSD was not found to have any association with presence of metabolic syndrome (p=0.60, Figure 1B).

Interestingly, while a current diagnosis of PTSD was significantly associated with the presence of metabolic syndrome, the association with each individual parameter of metabolic syndrome was not as strong. There were no statistically significant differences in mean waist circumference, fasting glucose, triglyceride or HDL cholesterol concentrations by current PTSD status (Table 2).

Given the significant association between current PTSD and metabolic syndrome, it was of interest to assess the contribution of PTSD to metabolic syndrome while controlling for other demographic, psychiatric, and pharmacologic factors that could moderate this relationship. Therefore, logistic regression modeling was utilized to control for other predictor variables, including age, sex, race, smoking history, antipsychotics, trauma exposure, and a current diagnosis of MDD. In this analysis, only a current diagnosis of PTSD (N=200, Wald $\chi 2 = 7.40$, p=0.0065) remained a significant predictor of metabolic

syndrome (Table 3). Of particular note, the association between current PTSD and metabolic syndrome was not due to use of antipsychotic medication (Wald χ^2= 0.79, p=0.38) or comorbid MDD (Wald χ^2= 2.70, p=0.10). Finally, we performed an additional regression, including the same predictor variables as above, with the addition of exercise level as a covariate, and current PTSD remained a significant predictor of metabolic syndrome (N=177, Wald χ^2= 7.41, p=0.006). Using this logistic regression analyses, a lifetime diagnosis of PTSD was not associated with the presence of metabolic syndrome (p>0.5).

Discussion

This study found that a current diagnosis of PTSD was associated with a significantly increased risk for the presence of metabolic syndrome. The rate of metabolic syndrome in this study as a whole (33.2%), and particularly amongst those with current PTSD (47.8%), was much higher than that reported among the general adult population in the National Health and Nutrition Examination Survey (20-31%) [43,44,51]. Even after evaluating multiple potentially confounding variables, such as age, sex, race, smoking history, trauma exposure, antipsychotic use, MDD, and exercise this association remained significant. These data suggest that the increased rates of metabolic syndrome and cardiovascular risk factors observed in low income African-Americans [52] may be related to the heightened rates of trauma exposure and subsequent PTSD.

The results are similar to those found in other studies of PTSD and metabolic abnormalities utilizing subjects drawn from populations with high risk for trauma. For example, PTSD related to combat exposure has been associated with elevated lipids [26,27], diabetes [53], and metabolic syndrome [21,23,54,55]. Additionally, studies of civilian police officers with significant trauma exposure have also identified associations between a diagnosis of PTSD and the presence of lipid abnormalities [25] as well as metabolic syndrome [56]. However, this is the first study that we are aware of in which the role of PTSD has been examined in a civilian population with known health disparities in cardiovascular disease and metabolic syndrome. It is possible that this association may underlie the known correlation between PTSD and adverse cardiovascular events. A prospective study of combat veterans demonstrated that a diagnosis of PTSD predicted subsequent cardiac mortality [18], and multiple cross-sectional studies have reported a correlation between a diagnosis of PTSD and adverse cardiovascular outcomes including higher rates of angina pectoris, diagnosis of coronary artery disease, stroke and myocardial infarctions [57].

Given the frequent use of atypical antipsychotic medications as a pharmacologic augmentation strategy in the treatment of PTSD and/or MDD, and the consistent association between use of these medications and metabolic syndrome, it was plausible that the association between PTSD and metabolic syndrome was mediated by increased use of these medications in subjects with PTSD. However, not only was the rate of antipsychotic use lower within the subjects with a current diagnosis of PTSD versus those without that diagnosis, but also the use of these medications was not associated with metabolic syndrome in this study. Therefore, the use of antipsychotic medications did not mediate the current association between PTSD and metabolic syndrome. Given the relatively small sample that was taking antipsychotic medication, we were not likely powered to demonstrate a true negative finding for this lack of association. Notably, in this study, the rates of antipsychotic use were not significantly different in the PTSD group. We have previously found that PTSD is widely clinically underdiagnosed in this population [16], so that antipsychotic prescription rates may reflect primary psychotic disorders, but are unlikely used frequently for PTSD symptoms. Further, the magnitude of the effect of PTSD diagnosis on predicting the presence of metabolic syndrome was greater than the effect of age, which has been

documented to increase the prevalence of each metabolic risk parameter, as well as prevalence of the overall metabolic syndrome [58].

Despite the significant association between current PTSD diagnosis and the presence of metabolic syndrome, PTSD was not associated with each individual metabolic risk parameter. However, the detrimental health impact of metabolic syndrome is significant, with an approximate 2.5 fold increase in the odds of developing cardiovascular disease[58]. The magnitude of this risk highlights the public health impact of PTSD, and demonstrates the need for heightened vigilance for and treatment of metabolic syndrome within this population.

The mechanism by which PTSD mediates the association between trauma exposure and metabolic syndrome in this population is not clear, but may reflect the cumulative detrimental physiological impact of repeated activation of the body's stress response system [58,59]. In response to stressors, activation of the sympathetic nervous system leads to increased release of catecholamines, which upregulate the production of lipoprotein lipase, ultimately leading to increased concentrations of cholesterol and triglycerides, a key component of metabolic syndrome. Further, stress-induced activation of the hypothalamic-pituitary-adrenal(HPA) axis leads to the release of glucocorticoids, which increase the deposition of abdominal fat, which leads to increased waist circumference and is associated with insulin resistance [60]. The finding that the risk for current PTSD is more strongly associated with a diagnosis of metabolic syndrome than meeting criteria for each individual metabolic risk factor is consistent with previous studies in which a more comprehensive measure is a better predictor of overall health risk than more reductionist approaches that examine biological risks factors as individual parameters [30].

There are a number of potential limitations to this study. First, there is a very high overlap between PTSD and MDD, such that the distinction in a sufficiently traumatized subject may not be important for medical sequellae. Thus, we examined models with and without MDD as a covariate, demonstrating similar results, suggesting that MDD did not account for the relationship between PTSD and metabolic syndrome. It would also be nice to examine the time since index trauma as a potential predictor of metabolic syndrome. Unfortunately, due to the highly traumatized nature of our subjects, with multiple past criterion A traumas, we do not feel that our data would fairly represent this relationship. We recommend that future studies (for example with combat veterans) examine the specific interaction of time since index trauma and metabolic syndrome. Additionally, larger, more well-powered studies may better address whether level of PTSD severity is associated with increased risk of metabolic syndrome.

It is also important to note that correlation does not imply causation. Thus, we cannot be certain that PTSD is causing additional rates of metabolic syndrome as opposed to the other interpretation which is that metabolic syndrome might place people at higher risk for developing PTSD, although we think the preponderance of data would not be consistent with this interpretation. Additionally, both PTSD and metabolic syndrome may both be secondary to a yet undetermined factor, e.g. HPA-axis dysregulation. We should point out that PTSD accounted for 30% of the additional variance in metabolic syndrome in this cohort, and the baseline rate of 48% is still very highly elevated beyond the general population. The additional reasons for this high rate of metabolic syndrome are multifactorial, but may also be due at some level to subsyndromal PTSD and trauma sequelae that were controlled for in these analyses. It is likely that poverty, poor diet selection, lack of exercise and other well-known factors may also be contributing to the high baseline rate of metabolic syndrome.

Interestingly, individuals with a lifetime history of PTSD, but not a current diagnosis of PTSD, did not demonstrate higher rates of metabolic syndrome, suggesting that the metabolic risk associated with PTSD may reflect the acute state of PTSD symptoms. On the other hand, although the diagnostic criteria are identifying 'current PTSD', in this population current PTSD is generally of prolonged duration and severity, and is often untreated. It is likely that those with a current diagnosis of PTSD represent individuals with a higher chronic and severe condition than those who meet lifetime, but not current diagnostic criteria. In future studies, it will be important to investigate whether effective treatment of PTSD within this population may reduce the prevalence of metabolic syndrome and ameliorate the adverse cardiovascular outcomes. Overall, these findings point out the importance of screening for PTSD, as well as for metabolic syndrome in this at-risk population, and suggest that active PTSD may play a role in the health disparities seen within traumatized, inner city, minority populations.

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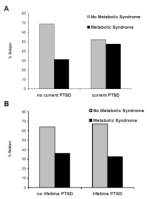

Figure 1. Effects of PTSD Status on Prevalence of Metabolic Syndrome

The percentage of subjects who meet criteria for presence vs. absence of metabolic syndrome are shown. A) Percentage of subjects meeting criteria for Metabolic Syndrome for those without vs. those with current PTSD diagnosis are shown, demonstrating significantly greater metabolic syndrome rates in those with current PTSD (N=245, $p<0.05$). B) Percentage of subjects meeting criteria for Metabolic Syndrome for those without vs. those with lifetime (but not necessarily current) PTSD diagnosis are shown, demonstrating no difference in metabolic syndrome rates in those with a history of PTSD (N=245, $p>0.50$).

Table 1

Characteristics of Participants by Current PTSD Status (N=245)

Measure	No current PTSD (n=199)	Current PTSD (n=46)	P value
Age, mean (sd) in years	46.0 (11.86)	43.70 (10.98)	0.252
Sex, No. (%)			
Men	79 (39.7%)	14 (30.4%)	0.243
Women	120 (60.3%)	32 (69.6%)	
Race, No. (%)			
African American	174 (88.8%)	40 (90.9%)	0.890
Caucasian	15 (7.7%)	3 (6.8%)	
Other	7 (3.6%)	1 (2.3%)	
Marital Status, No. (%)			
Not Married	175 (89.3%)	36 (81.8%)	0.170
Married	21 (10.7%)	8 (18.2%)	
Education, No. (%)			
Less than HS	41 (20.9%)	11 (25.0%)	0.414
GED or HS Grad	79 (40.3%)	13 (29.5%)	
≥ Some College	76 (38.8%)	20 (45.5%)	
Employment, No. (%)			
Unemployed	100 (51.0%)	25 (56.8%)	0.651
Disabled	53 (27.0%)	12 (27.3%)	
Employed	43 (21.9%)	7 (15.9%)	
Monthly Income, No (%), $			
Less than $250	59 (30.7%)	16 (38.1%)	
$250-$499	23 (12.0%)	2 (4.8%)	0.238
$500-$999	56 (29.2%)	16 (38.1%)	
$1000 or more	54 (28.1%)	8 (19.0%)	
Cigarette Smoking, No. (%)			
Never Smoked	49 (25.8%)	13 (32.5%)	0.385
Lifetime Hx Smoking	141 (74.2%)	27 (67.5%)	
Current Substance Abuse, No. (%)			
No Current Substance Abuse	184 (95.3%)	40 (90.9%)	0.244
Current Substance Abuse	9 (4.7%)	4 (9.1%)	
Currently on Antipsychotics, No. (%)	17 (8.5%)	5 (10.9%)	0.619
Time of Trauma, No. (%)			
None	26 (14.2%)	0 (0%)	0.064

Measure	No current PTSD (n=199)	Current PTSD (n=46)	P value
Adult Only	71 (38.8%)	17 (42.5%)	
Childhood Only	30 (16.4%)	6 (15.0%)	
Child and Adult	56 (30.6%)	16 (42.5%)	
Amount of Trauma, No. (%)			
Not Experienced (but witnessed)	19 (10.3%)	2 (4.7%)	0.092
1 type of trauma	20 (10.8%)	1 (2.3%)	
2 or more types of trauma	146 (78.9%)	40 (93%)	
Current MDD, No. (%)			
No Current MDD	176 (93.6%)	24 (57.1%)	<0.001
Current MDD	12 (6.4%)	18 (42.9%)	

Note, N's range from 223-245 due to occasional missing demographic data; All except for age (which was examined with ANOVA) are examined with chi-squared statistics.

Table 2

Metabolic Syndrome and Metabolic Parameters by Current PTSD Status (n=245)

Measure	No Current PTSD (n = 199)	Current PTSD (n = 46)	P value
Metabolic Syndrome ([a])			
Metabolic Syndrome Present	62 (31.2%)	22 (47.8%)	**0.03**
Metabolic Syndrome Absent	137 (68.8%)	24 (52.2%)	
Fasting Glucose (mg/dL) ([b])	102.4 (47.0)	93.9 (19.4)	0.23
Waist Circumference (cm) ([b])	100.4 (20.0)	104.0 (16.9)	0.27
Triglycerides (mg/dL) ([b])	126.4 (130.6)	116.4 (59.5)	0.61
HDL Cholesterol (mg/dL) ([b])	48.2 (16.2)	51.7 (20.5)	0.22
LDL Cholesterol (mg/dL) ([b])	107.8 (41.1)	101.2 (26.3)	0.30
Systolic Blood Pressure (mmHg)	128.2 (23.2)	129.8 (24.9)	0.67
Diastolic Blood Pressure (mmHg)	76.5 (12.2)	75.1 (13.2)	0.49

[a] data are presented as number of subjects (percentage)

[b] Values for the individual metabolic parameters are expressed as mean (standard deviation).

Table 3

Current PTSD Predicts Metabolic Syndrome After Controlling for Comorbidity (N=200)

Variable	Wald $\chi 2$	p-value
Age	3.59	0.058
Sex	0.087	0.77
Race -		
African American	0.63	0.73
Caucasian	0.62	0.43
Other	0.52	0.47
Lifetime Smoking History	0.087	0.77
Current Use of Antipsychotic Medication	.79	0.38
Number of Trauma Types	0.41	0.52
Current MDD	2.70	0.10
Current PTSD	7.40	**0.0065**