Prevalence of Metabolic Syndrome in a Drug Naïve Patients with Depressive Disorder

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ABSTRACT

Introduction: A metabolic syndrome (MS) is a group of metabolic abnormalities. According to the Modified National Cholesterol Education Program-Adult Treatment Panel (NCEP-ATP) III criteria, risk factors for MS are obesity, raised blood pressure, prothrombin state, atherogenic dyslipidemia and insulin resistance. The present study aimed at assessing the prevalence of metabolic syndrome in patients with depression who are drug naïve and compare the same with a matched group of healthy controls.

Material and methods: The sample consisted of two groups: group I had 50 drug-naive patients recruited from psychiatric inpatient and outpatient facility of tertiary care Hospital and group II had 50 participants recruited from the healthy relatives of the patients attending the psychiatry services or staff members. Patients were subjected to a semi structured psychiatric interview, using the diagnosis was made using the ICD-10 criteria. Detection of metabolic syndrome was based on the Association of Physicians of India (API) criteria for metabolic syndrome.

Results: The prevalence of metabolic syndrome was significantly higher in Drug naïve depressive patients 19(38%) than in the control group 3(6%) (P=0.001) which is statistically significant. Patients diagnosed with metabolic syndrome had significantly higher mean value of Fasting triglyceride level (P=0.02) compared to the control group. In comparison to healthy control patients with depression shows significant difference in the mean of systolic blood pressure (P=0.001), diastolic blood pressure, (P=0.001) and fasting sugar level (P=0.001) compare to healthy control.

Conclusions: The current study concluded that prevalence of metabolic syndrome is higher in drug-naive psychotic patients.

Keywords: Cardiovascular Mortality, Depression, Metabolic Syndrome

INTRODUCTION

ATP III identified coronary artery disease as the primary outcome of MS. Apart from CHD individuals with MS are also vulnerable to conditions such as fatty liver, PCOD, gallstone, asthma, sleep disorders and few types of carcinoma.[1]

The MS, in patients with depression and stress related problems, may be associated with neurohormonal dysfunction.[2] The Obesity has been linked with depression, especially in women. An Independent increase of risk for coronary heart disease in depressive patients may be explained by a positive association between depression and visceral adipose tissue. Whether depression leads to obesity or obesity causes depression is unclear.[4] Obesity and depression are both associated with low self-esteem, social stigma, and chronic health conditions. When depression occurs in obese patients, the consequences are significant in terms of negative affect on the quality of life, impaired social functioning, and leads to poor mental health. On the other hand, obesity attached to depression has significant impact on the occupational functioning, owing to reduced participation in work and high cost of treatment.[3]

The Prevalence of MS is stated to be in the range of 11.7–57% in patients with depression or depressive symptoms, taken from general hospitals or community.[5] In one Indian study, in the patients with depression the prevalence of the MS is 44%, which were receiving psychotropics[5] and the other two studies stated MS prevalence of 37%[5] 46% in drug-naive patients with depression.[6] Because of the high prevalence and the morbidity and mortality associated with this syndrome, a thorough understanding of its risk factors is key to designing primary and secondary prevention programs.

It has been seen that some of the medications used in depressive patients are known to affect metabolic parameters.[5] So, to have a deeper knowledge of the prevalence of MS, it is necessary to assess the patients who are relatively free from medications. In this point of view, this study aims to assess the prevalence of MS in patients with depression who are drug naïve and compare the same with a matched group of healthy controls.

MATERIAL AND METHODS

This is a cross-sectional study. The study was conducted

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after getting approval from the Ethics Review Committee of the institute. The study was carried out at the outpatient and inpatient unit of tertiary care hospital in North India. patients were taken after obtaining informed consent using a purposive sampling technique. The total duration of the study was one year. The study group comprised of two groups, first, those patients who diagnosed to have depressive disorders (first-episode depression, recurrent depressive disorder, and dysthymia) as per ICD-10.[7] The second group included a healthy control, who were matched to the disease group for the socio demographic variables of age, gender, education, and domicile.

The patients with depression who meet the following criteria i.e. Age between 18-50 years, drug-naive (never received any psychotropic agent continuously for more than two weeks and not so in the last three months, ascertained by information obtained from patients and his/her caregiver on behalf of the patient if the patient is not in the condition to give information required and review of the past medical records), and not have any history of any psychiatric disorder or physical comorbid condition (other than hypertension and diabetes mellitus) which can affect the metabolic profile of the patients are eligible for the study. The healthy relatives accompanying the patients for consultation in the psychiatry department or staff members are recruited as the healthy control group after excluding those with history of any psychiatry morbidity or exposure of any psychotropic medication.

Anthropometric and metabolic evaluation: The physical evaluation included measurement of waist circumference (in cm) by a flexible tape and recording of blood pressure (BP). Waist circumference was measured midway between the inferior costal margin and the superior border of the iliac crest, at the end of normal expiration in standing position. By using sphygmomanometer, at least two readings at five-minute intervals were taken to measure the BP in the supine position. If BP was found to be high (≥140/90), then the third reading after 30 minutes was obtained; the lowest of these readings were taken. Fasting venous blood sample was collected under aseptic conditions to measure the blood glucose (fasting blood sugar (FBS), triglycerides (TG), and high-density lipoprotein (HDL) levels.

Association of Physicians of India (API) criteria for metabolic syndrome[8]: It has been formed by Association of Physicians of India. It is based on percentage body fat and morbidity data. In Asian Indians it has been found that normal BMI are narrower and lower than white Caucasians according to revised guidelines for metabolic syndrome diagnosis. For metabolic syndrome three out of five factors have to be abnormal. Factors defining metabolic syndrome are

(1) Abdominal obesity-given as waist circumference of either >90cm (if Men) or >80cm (if Women),
(2) Blood pressure measurement given as: Systolic >130 mm Hg/Diastolic >85 mm Hg,
(3) Fasting high density lipoprotein Men <40mg/dl or Women <50mg/dl,
(4) Fasting Triglyceride >150mg/dl
(5) Fasting glucose >100 mg/dl

In the control group, those patients and healthy subjects who found to have metabolic abnormalities were explained about it. They were further provided information regarding regular exercise, better diet, and specialist referral if required Patients and healthy subjects in the control group found to have metabolic abnormalities were informed about the same. They were explained about the need for proper diet and regular exercise, and referred for specialist care whenever required.

Statistical analysis was done using the SPSS version 21 for Windows (Chicago, Illinois, USA). Appropriate test applied and result were obtained.

RESULTS

Sociodemographic profile: The study sample incorporated 50 patients which were diagnosed with depressive disorders and 50 patients in the healthy control group. The age, gender, education, and domicile were matched for, both the groups were matched according to the study design. As depicted in Table-1, the mean age of the patients with depression was 32.38±11.11 years and that of the control group was 26.88±6.09 years, which shows a statistically significant difference. Male predominant female in both the group. The majority of the participants in the depression and healthy control group were illiterate. Majority of the subjects in both the groups were married Hindus belonging to low socioeconomic status and from rural background. However, there is a statistical difference in terms of occupation between both the group.

Table 2 depicts that in terms of marital status, a statistically significant difference has been found between depressive patients diagnosed with and without MS.

As depicted in Table 3, the value of Systolic blood pressure, Diastolic blood pressure, and fasting glucose level shows a significant difference between patients with depression and the control group.

As depicted in Table 4, 19 patients of depressive disorder with MS (38%) show a statistically significant difference with participants from depressive disorder without MS 31(62%) in terms of Fasting triglyceride level. This parameter is significantly higher in patients with metabolic syndrome.

DISCUSSION

Nowadays significant public health challenges are encountered in MS and depression. Recently their linkage has gained attention, as due to increasing risk of cardiovascular disease. Several studies have concluded that a bidirectional relationship exists between depression and MS.[9] HPA axis can be activated by the depression which leads to more deposition of visceral adipose tissue due to increasing release of hydro-corticotrophin, adrenocorticotropic, and cortisol hormones.[2] The unhealthy behaviours such as alcohol consumption, smoking, poor diet, a sedentary lifestyle, sleeping disorder and poor adherence to treatment can be induced by depression which leads to metabolic syndrome.[10–13] Antidepressants can also affect the indicators

	Depression (N=50)	Control (N=50)	X² -Value	P-Value
	n (%)	n (%)		
Age (mean ± SD)	32.38 ± 11.11	26.88 ± 6.09	t=3.060	< 0.001*
Sex				
Male	35(70%)	31(62%)	0.713	0.40
Female	15(30%)	19(38%)		
Residence				
Rural	50(100%)	50(100%)	0.000	1.00
Urban	0(0%)	0(0%)		
Education				
Illiterate	16(32%)	17(34%)	0.456	0.50
Literate	34(68%)	33(66%)		
Marital status				
Married	36(72%)	35(70%)	0.049	0.82
Unmarried	14(28%)	15(30%)		
Occupation				
Employed	50(100%)	50(100%)	0.000	1.00
Unemployed	0(0%)	0(0%)		
Socio economic status				
Lower	34(68%)	31(62%)	1.568	0.70
Upper lower	7(14%)	10(20%)		
Lower middle	4(8%)	6(12%)		
Upper middle	5(10%)	3(6%)		
*statistically significant, p < 0.05.				

Table-1: Comparison of socio demographic data among drug-naive depressive patients and Control.

	MS Present (N=19)	MS Absent (N=31)		
	n(%)	n (%)	x²-value	p-value
Age(mean ± SD)	32.04 ± 10.25	32.62 ± 11.86	t=0.1764	0.86
Sex				
Male	10(52.6%)	25(80.6%)	4.402	0.03*
Female	9(47.4%)	6(19.4%)		
Marital status				
Married	10(52.6%)	26(83.9%)	5.702	0.02*
Unmarried	9(47.4%)	5(16.1%)		
Education				
Illiterate	6(31.6%)	10(32.3%)	0.002	0.96
Literate	13(68.7%)	21(67.7%)		
Occupation				
Employed	19(100%)	31(100%)	0.000	1.00
Unemployed	0(0%)	0(0%)		
Background				
Rural	19(100%)	31(100%)	0.000	1.00
Urban	0(0%)	0(0%)		
Socioeconomic status				
Lower	11(57.9%)	23(74.2%)	4.076	0.25
Upper lower	2(10.5%)	5(16.1%)		
Lower middle	3(15.8%)	1(3.2%)		
Upper middle	3(15.8%)	2(6.5%)		
*statistically significant, p<0.05.				

Table-2: Comparison of socio demographic data among drug-naive depressive patients with and without metabolic syndrome.

of metabolic syndrome.[13] On the other hand, due to obesity and the social stigma and the raised level of inflammatory cytokines such as IL-6, CRP and, leptin resistance, in the patients with metabolic syndrome they are more vulnerable to depression.[10,13,14]

Similar to earlier studies, the present study did not find any association among demographic variables on metabolic parameters in patients with depression.[15,16] except marital

	Depression (N=50)	Control (N=50)		
Variables	**Mean ± SD**	**Mean ± SD**	**t-value**	**P-Value**
Waist circumference	88.72 ± 7.55	86.78 ± 5.21	1.4954	0.14
Fasting triglyceride level	141.46 ± 38.34	138.38 ± 11.82	0.5428	0.59
HDL	50.42 ± 9.32	51.26 ± 5.55	0.5476	0.59
SBP	130.4 ± 8.9	119.28 ± 7.65	6.700	<0.00*
DBP	85.36 ± 7.6	78.04 ± 8.52	4.533	<0.00*
Fasting glucose level	102.98 ± 13.24	83.1 ± 8.53	8.925	<0.00*
MS	19(38%)	3(6%)	13.112	< 0.001*
*statistically significant, p<0.05				

Table-3: Comparison between drug-naive depressive patients and Control with respect to metabolic syndrome criteria.

	MS Present (N=19)	MS Absent (N=31)		
Variables	**Mean ± SD**	**Mean ± SD**	**t-value**	**P-Value**
Waist circumference	90.11 ± 7.61	87.87 ± 7.51	1.0186	0.31
Fasting triglyceride level	156.53 ± 43.99	132.23 ± 31.75	2.265	0.02*
HDL	51.26 ± 12.14	49.9 ± 7.27	0.4967	0.62
SBP	132.21 ± 7.86	129.29 ± 9.43	1.1294	0.26
DBP	87.89 ± 3.74	83.81 ± 8.9	1.8925	0.06
Fasting glucose level	107.47 ± 9.81	100.23 ± 14.42	1.9284	0.06
*statistically significant, p<0.05.				

Table-4: Comparison between drug-naive depressive patients with metabolic syndrome and those without metabolic syndrome with respect to metabolic syndrome criteria.

status[6] and gender. Some studies have reported that MS is more common in females, because of the sex hormones that affect the body's metabolism[17–19], and only a few studies have reported a higher prevalence in males (as in the present study).[20] Although an association was found between gender and MS in some of the western studies.[21] Contrary to our study, past studies have reported an association of MS with higher education level, because of lower participation in sports and deeper involvement in academics.[22]

The prevalence of MS in depressive patients in the present study(38%) is comparable to previous studies from other centres in North India (37–46%)[5,6] and some studies from the west.[23] One study was conducted on patients with depression, who were receiving antidepressants (MS-44%),[5] whereas the other two studies were on drug-naive patients with depression. Of these, one had a 37% MS prevalence in which 20% of patients had physical or psychiatric comorbidities[5] and others had a 46% prevalence of MS.[6] In one study[20], the prevalence rate of MS in depression was 20%, which was lower than the prevalence of the current study.

This study found a statistically significant elevation in fasting blood glucose level along with raised blood pressure among patients compared with controls, abnormal fasting blood glucose level occur perhaps as a consequence of the increased release of counter-regulatory hormones, patients with major depression exhibit insulin resistance during insulin tolerance tests and oral glucose tolerance tests (GTTs).[2,9,10,21,24,25] Similar to earlier studies present study shows abnormal raised blood pressure in depressive patient compared to healthy controls.[16,26,27] Similar to earlier studies, we have also found MS association with elevated fasting triglyceride levels.[28,29]

Contrary to the findings of a large longitudinal study[2,30] we could not find any significant difference in the proportion of depressed patients and the healthy controls having increased waist circumference.

Limitations: cross-sectional design, small sample size, purposive sampling, hospital-based sample, not assessed relationship between metabolic parameters with the severity of illness and treatment refractoriness, dietary and lifestyle factors, and their association with MS. Future studies should be conducted in a larger sample, with better study design and should attempt to overcome above limitations.

CONCLUSION

The prevalence of MS is higher in drug-naive depressive patients compared with controls. According to this study it has been interpreted that depression is notable forecaster for the beginning of the metabolic syndrome. The development of metabolic syndrome can be significantly reduced by focusing on intervention studies for depression.

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