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Original Research Article

Metabolic syndrome in psychiatric outpatients in a tertiary care center in Eastern India

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ABSTRACT

Background: Metabolic syndrome (MS) refers to a clustering of metabolic risk factors and compared to the general population, the prevalence of MS and its components is higher in populations with mental illness across all major diagnostic groups. Aim was to study the prevalence and correlates of MS in a cohort of psychiatric outpatients in a tertiary care centre in Eastern India.
Methods: One hundred and sixty-four consecutive patients attending the outpatient service of Department of Psychiatry were recruited. The sociodemographic, clinical and physical activity profile of these patients were recorded by using a proforma specially designed for this purpose. Metabolic syndrome (MS) was diagnosed by the International Diabetic Federation criteria (IDF, 2006).
Results: A typical subject was: married (64.6%), male (63.4%) and aged 38.76 years. The most common ICD-10 diagnostic categories were unipolar depression (28%), neurotic, stress related and somatoform disorders (28%), psychoses (21.9%), and bipolar disorder (9.7%). The mean age for onset and duration of illness were 31.65 years and 79 months respectively. The mean number and duration of psychotropic medication received by the subjects were 2.51 and 25.9 months respectively. An IDF criteria-based diagnosis of MS was made in 39% cases. A diagnosis of MS had a significant positive correlation with age, age at onset, duration since onset, number of comorbid medical illness, duration and number of psychotropic medications received, depressive disorders, and BMI.
Conclusions: MS is common among subjects with psychiatric disorders and the prevalence of MS in our sample was consistent with the findings reported in literature.

Keywords: Correlates, Metabolic syndrome, Prevalence, Psychiatric disorders

INTRODUCTION

Patients suffering from psychiatric disorders are at a greater risk of premature all-cause mortality compared to general population. Epidemiological studies have found that, life expectancy is reduced by 7-24 years in patients with major psychiatric disorders.[1] Metabolic syndrome (MS) is a disorder characterized by central obesity, dyslipidemia, abnormal glucose tolerance and hypertension and is hypothesized to cause by Insulin resistance and a proinflammatory state.[2-4] A survey from United States reported the prevalence of MS at 24% in adults and found that men were at risk of cardiovascular mortality and all-cause mortality and women had increased risk of coronary artery disease.[5]

Different criteria of MS have been adopted from time to time. The criteria proposed by the National Cholesterol Education Program Adult Treatment Panel III (ATP III) with revision in 2005 by the American Heart Association/National Heart, Lung, and Blood Institute (updated ATP III) and the International Diabetes Federation (IDF) are widely used worldwide as they provide a differential profile for populations of Asian origin.[6-8] Central to these definitions is abdominal obesity. The other parameters are serum triglyceride levels, high density lipoproteins, systolic and diastolic blood pressure and fasting plasma glucose levels. IDF definition needs central obesity plus any other two or more out of five criteria, whereas the updated ATP III definition requires any three or more of the five criteria.[7,8]

A study by Cameron et al reported the prevalence of MS in populations around the world as ranging among men from 8% in India to 24% in United States and among women from 7% in France to 46% in India.[9] However, prevalence studies of MS using IDF criteria (being of later origin) are scarce. Three studies in general populations from South India using updated ATP III and IDF definitions of MS have reported prevalence of 41%, 25.8%, and 28.9% respectively.[10-12]

Meta-analysis has shown that the prevalence of MS is 58% higher in psychiatric patients than in the general population across all major diagnostic groups.[13] A meta-analysis by Vancampfort et al found that, patients with schizophrenia had a significantly higher risk of abdominal obesity (OR=4.43), hypertriglyceridemia (OR=2.73), low HDL-C (OR=2.35), hypertension (OR=1.36), and MS (OR=2.35).[14] Metabolic disturbances in schizophrenia found to be increased with illness duration and age.[15,16] Depression and MS was found to be modestly associated (adjusted OR=1.34) in a systematic review of 29 cross-sectional studies involving 1,55,333 subjects.[17] Prevalence of MS was found to be 37.3% in a meta-analysis of 37 studies involving around 7000 bipolar disorder patients.[18] Another meta-analysis examining the risk of MS in persons with high anxiety found a weak, but significantly increased risk (OR=1.07).[19] Indian studies have reported a prevalence of MS ranging from 24% to 62.5% in patients with psychiatric disorders depending upon the criteria used and diagnostic category considered.[20-29] Those studies have found body mass index (BMI), age, female gender, urban locality, smoking, family history of chronic lifestyle disease, level of functioning and use of second-generation antipsychotics to be significantly associated with MS.[20-29]

Current study was an attempt to find out the prevalence and correlates of MS in psychiatric outpatients in a tertiary care center in Eastern India.

Aims and objectives

The present study attempted to find the prevalence and selected demographic and clinical correlates of MS in psychiatric outpatients in a tertiary care center in Eastern India.

METHODS

The study was conducted at the outpatient psychiatry department of a multispecialty hospital in Eastern India, after ethical clearance from the Institutional Ethics Committee (IEC). The study period was between the month of August and September 2019. The study design was cross-sectional. The subjects were assessed and interviewed only once for intake into the study. The sample comprised of consecutive patients attending psychiatric outpatient department. For assessment of MS, the IDF criteria were preferred because it took into cognizance the differential profiles of South Asian subjects.[8] Subjects less than 15 years of age and those not assigned a primary axis I psychiatric disorder as per ICD-10 at the time of intake were excluded from the study.[30] The sample did not include patients with primarily substance abuse or its complications because they attend separate specialty outpatient clinic (drug deaddiction and treatment clinic) on a particular day of the week.

Written informed consent was taken from the patients. Height, weight, blood pressure and waist circumference were measured. The sociodemographic data were recorded. The clinical data were gathered from the clinical interview. The patients were seen by qualified psychiatrist and the diagnosis written on the prescription was accepted. For ease of analysis, the diagnoses were clubbed together in five broad groups (ICD-10 codes): psychoses (F20-29), bipolar disorder (F30-31), unipolar depression (F32-34), Neurotic, stress related and somatoform disorders (F40-F48) and remaining diagnostic groups (others). For further analysis, diagnoses F20, 22, 25, 29-33, and 34.1 were clubbed together as ‘severe mental illnesses’.

Mid abdominal waist circumference (in cm) was measured in the horizontal plane midway between lowest rib and the iliac crest at the end of normal expiration. The triglyceride (TG), high-density lipoprotein (HDL), fasting blood sugar (FBS) and the low-density lipoprotein (LDL) levels (mg/dl) were measured in the biochemistry laboratory of the institute using fasting venous blood sample. Weigh (kg) and height (cm) were measured in the outpatient department using a common bathroom scale and a calibrated scale respectively. All anthropometric measurements were done by one of the authors (MC). The body mass index (BMI) was calculated from the weight and height using the formula weight in kg divided by the square of the height in meters (kg/m^2). Blood pressure was defined as the systolic and diastolic blood pressures in mm of Hg. Subjects met the criteria of MS as per IDF if they fulfilled the criteria of waist circumference ≥90 cm for males and ≥80 cm for females and 2 or more of the following criteria, namely elevated TG ≥150 mg/dl, decreased HDL <40 mg/dl for males and 50 mg/dl for females or receiving treatment, elevated

blood pressure ≥130 mmHg systolic or 85 mmHg diastolic or receiving treatment for previously diagnosed hypertension, and elevated FBS ≥100 mg/dl or receiving treatment for the same.

Sample size was calculated using a sample size calculator.[31] While calculating, level of confidence was taken as 95%, precision (d) was 0.08, and mean prevalence of MS in psychiatric patients (calculated from previous studies) was 43.2%. Thus, N came to be 148. The final sample consisted of 164 patients with psychiatric disorders.

Statistical analysis

All analysis was done with the help of SPSS (version 21) and p value ≤0.05 was considered statistically significant.[32] For the continuous variables, we used descriptive statistics and comparisons were done with the Independent samples t-test. For the categorical variables, frequencies and percentages (%) were computed with the Pearson Chi-squared test with Yates' correction or Fisher's exact test. Binary logistic regression procedure was followed to estimate the strength of association between the independent variables and the presence of metabolic syndrome. A model for the regression analysis was made by entering each independent variable except those comprising the criteria for MS singly into the binary logistic regression and chosen for inclusion into the model if the p<0.1 for that independent variable. Odds ratio (OR) with 95% confidence interval (CI) were computed for the model derived as per the above scheme in the whole study population, and for the patients in the broad diagnostic groups of psychoses and affective disorders. For further sub-analysis, patients were divided into 2 groups, those with a BMI<25 and those without and were entered into the binary logistic regression to find the odds ratio of having MS if the BMI of the patient exceeded 25.

RESULTS

Table 1 (A and B) shows the diagnostic profile and the prevalence of the MS in the entire study population while Table 1 (C) shows the prevalence of the MS in severe mental illnesses, across the genders. The diagnostic profile of the entire study population was: psychoses (N=36), bipolar (N=16), unipolar depression (N=46), neurotic, stress related and somatoform disorders (N=46) and others (N=20); females had higher frequency of neurotic, stress related and somatoform disorders (36.7% versus 23%) while males had higher frequency of psychoses (25% versus 16.7%) and unipolar depression (28.8% versus 26.7%). The 20 patients with 'others' diagnoses included subjects with nonorganic insomnia, nightmares, mild mental retardation with behavioral problems, anxious avoidant personality disorder and organic personality disorder.

Table 1: Gender, diagnoses (ICD-10 codes) and prevalence of metabolic syndrome as per International Diabetes Federation.

	Total N (%)	Male N (%)	Female N (%)	P value
A. Entire study population- all diagnoses				
Total	164 (100)	104	60	
Psychoses (F 20-29)	36 (21.9)	26 (25)	10 (16.7)	0.386 χ^2=4.15 df=4
Bipolar (F 30-31)	16 (9.7)	10 (9.6)	6 (10.0)	
Unipolar depression (F 32-33, 34.1)	46 (28.0)	30 (28.8)	16 (26.7)	
Neurotic, stress related and somatoform disorders	46 (28.0)	24 (23.0)	22 (36.7)	
Others	20 (12.2)	14 (13.5)	6 (10.0)	
B. Prevalence of MS for all diagnoses (entire study population)				
MS as per IDF	64 (39.0)	36 (34.6)	28 (46.7)	0.005
Psychoses (F20-29)	08 (4.9)	02 (1.9)	06 (10.0)	Males- 0.008 χ^2=13.69; df=4 Females- 0.003 χ^2=16; df=4
Bipolar (F30-31)	04 (2.4)	02 (1.9)	02 (3.3)	
Unipolar Depression (F32-33, 34.1)	32 (19.5)	18 (17.3)	14 (23.3)	
Neurotic, stress related and somatoform disorders	18 (10.9)	12 (11.5)	06 (10)	
Others	2 (1.2)	02 (1.9)	0 (0)	
C. Prevalence of MS for Severe Mental Illness (defined by specified ICD codes)				
Total	98 (100)	66 (67.3)	32 (32.6)	
MS as per IDF	44 (44.9)	22 (33.3)	22 (68.7)	0.005
Psychoses (F20, 22, 25, 29)	08 (8.2)	02 (3.0)	06 (18.7)	Males- 0.002 χ^2=9.2; df=2 Females- 0.6 χ^2=0.267; df=2
Bipolar (F30-31)	04 (4.0)	02 (3.0)	02 (6.2)	
Unipolar depression (F32-33, 34.1)	32 (32.6)	18 (27.3)	14 (43.7)	

Difference significant when p<0.05 as per Pearson Chi-Square, χ^2=Chi-square value, df=degrees of freedom. % value within column.

The prevalence of MS as per IDF was 39% for the entire population and 44.9% for the subjects with severe mental illness. Whereas 34.6% of the males were found to have MS, the corresponding figure in females was 46.7%. Of the patients in the diagnostic subgroup of psychoses, 8.2% of patients were found to have MS (4.9% of total population). The corresponding figures for the patients in diagnostic subgroup of bipolar disorder and unipolar depression were 4% and 32.6% respectively (2.4% and 19.5% of total population respectively). A trend of female preponderance for the prevalence of MS was noted across different diagnoses for entire study population as well as in severe mental illness group except in neurotic, stress related and somatoform disorders where 11.5% (versus 10% in females) of males were found to have MS.

Table 2: Metabolic syndrome and its relationship with clinical variables and locality.

			MS as per IDF		
			Present N (%)	Absent N (%)	
Categorical variables					
Presence of elevated systolic blood pressure (as per IDF)	Total	66	36 (54.5)	30 (45.4)	0.001*
	Male	50	22 (44)	28 (56)	0.053*
	Female	16	14 (87.5)	02 (12.5)	<0.001*
Presence of elevated diastolic blood pressure (as per IDF)	Total	68	38 (55.9)	30 (44.1)	<0.001*
	Male	52	26 (50)	26 (50)	0.001*
	Female	16	12 (75)	04 (25)	0.01*
Urban	Male	94 (100)	34 (36.2)	60 (63.8)	0.651*
	Female	50 (100)	20 (40)	30 (60)	
Rural	Male	10 (100)	2 (20)	8 (80)	0.023*
	Female	10 (100)	8 (80)	2 (20)	
Continuous variables		**Mean (SD)**			
Age (years)	Total	38.76 (14.88)	47.96 (12.03)	32.9 (13.5)	<0.001
	Male	39.96 (15.64)	50.83 (11.07)	34.2 (14.65)	<0.001
	Female	36.7 (13.35)	44.28 (12/4)	30.06 (10.39)	<0.001
Time since onset (months)	Total	79 (86.57)	99.34 (93.41)	65.98 (179.7)	0.016
	Male	83.59 (90.17)	100.17 (87.09)	74.8 (91.1)	0.174
	Female	71.03 (80.07)	98.28 (102.6)	47.18 (42.13)	0.012
Age at onset (years)	Total	31.65 (15.35)	38.84 (14.26)	27.06 (14.29)	<0.001
	Male	32.67 (16.75)	42.5 (14.35)	27.47 (15.63)	<0.001
	Female	29.9 (12.52)	34.14 (12.9)	26.18 (11.07)	0.013
Total number of co morbid medical illness	Total	0.76 (0.95)	1.34 (1.02)	0.4 (0.7)	<0.001
	Male	0.73 (0.9)	1.389 (1.02)	0.38 (0.59)	<0.001
	Female	0.83 (1.04)	1.28 (1.04)	0.43 (0.87)	0.001
Total duration of psychotropic medication received (months)	Total	25.9 (52.72)	40.16 (70.4)	16.8 (34.7)	0.005
	Male	24.25 (52.37)	35.61 (70.30)	18.23 (39.02)	0.108
	Female	28.76 (53.70)	46 (71.36)	13.68 (23.45)	0.019
Total number of psychotropic medications received	Total	2.51 (3.03)	3.06 (3.26)	2.2 (2.8)	0.063
	Male	2.26 (2.92)	2.83 (3.35)	1.97 (2.64)	0.153
	Female	2.93 (3.2)	3.35 (3.18)	2.56 (3.23)	0.343
Total number of current psychotropic medications	Total	2.35 (0.72)	2.44 (0.9)	2.3 (0.5)	0.237
	Male	2.4 (0.79)	2.55 (1.13)	2.3 (0.53)	0.158
	Female	2.26 (0.57)	2.28 (0.59)	2.25 (0.56)	0.814
Duration of activity (minutes)	Total	14.27 (26.94)	11.4 (19.9)	16.1 (30.5)	0.278
	Male	17.01 (27.5)	16.94 (23.55)	17.05 (29.55)	0.984
	Female	9.5 (25.45)	4.28 (10.7)	14.06 (32.98)	0.139
Waist circumference (cm)	Total	88.64 (10.92)	95 (5.5)	84.6 (11.6)	<0.001
	Male	89.15 (10.86)	96.1 (4.73)	85.47 (11.4)	<0.001
	Female	87.76 (11.05)	93.57 (6.2)	82.68 (11.9)	<0.001
Triglycerides (mg/dl)	Total	153.92 (74.72)	185.2 (89.9)	133.9 (54.9)	<0.001
	Male	159.8 (83.3)	205.7 (102.9)	135.52 (58.32)	<0.001
	Female	143.73 (56.07)	158.9 (61.9)	130.4 (47.43)	0.049
High density lipids (mg/dl)	Total	46.46 (12.58)	47.9 (10.05)	45.5 (13.9)	0.231
	Male	43.11 (9.08)	45.9 (9.01)	41.61 (8.82)	0.02
	Female	52.26 (15.48)	50 (10.8)	53.81 (18.64)	0.413

Continued.

			MS as per IDF		
			Present N (%)	Absent N (%)	
Fasting blood sugar (mg/dl)	Total	107.54 (43.02)	130.4 (55.5)	92.9 (23.2)	<0.001
	Male	101.11 (31.34)	119.7 (44.7)	91.29 (13.45)	0.001
	Female	118.7 (56.56)	144.14 (65.04)	96.43 (36.17)	0.001
Weight (kg)	Total	63.63 (11.85)	66.7 (9.13)	61.7 (12.9)	0.007
	Male	65.75 (11.87)	69.3 (8.38)	63.85 (13.01)	0.24
	Female	59.96 (10.97)	63.35 (9.09)	57 (11.73)	0.024
Body mass index (kg/m^2)	Total	24.30 (4.25)	26.23 (2.56)	23.07 (4.7)	<0.001
	Male	23.53 (3.94)	25.35 (2.25)	22.57 (4.31)	<0.001
	Female	25.63 (1.47)	27.36 (2.52)	24.12 (5.24)	0.004
Height (mt)	Total	1.62 (0.09)	1.6 (0.1)	1.6 (0.09)	0.007
	Male	1.67 (0.06)	1.65 (0.06)	1.68 (0.06)	0.03
	Female	1.53 (0.07)	1.52 (0.09)	1.54 (0.06)	0.313

Difference significant when p<0.05. * as per Pearson Chi-Square, other results as per means procedure.

Table 3: Binary logistic regression analysis.

A. Binary logistic regression analysis for whole study population (n=164)				
Variable	**Coefficient B**	**Standard error (SE)**	**Odds ratio**	**95% CI**
Age in years	0.251	0.096	1.285	1.064-1.551
Diagnoses (Psychoses versus others)	-0.598	0.926	0.550	0.090-3.374
Unipolar and recurrent depression versus others	5.586	1.313	1.614	1.143-1.875
Duration since onset	0.040	0.011	1.361	0.942-1.981
Age at onset	0.297	0.097	1.743	1.614-1.899
Number of comorbid medical illness	2.593	0.599	1.075	1.023-1.242
Total duration of psychotropic medication received (months)	0.020	0.008	1.980	1.966-2.996
Total number of psychotropic medications received	0.423	0.159	1.527	1.118-2.085
BMI	6.144	1.389	1.231	1.131-1.593
Constant	6.097	3.160		
B. Binary logistic regression analysis for broad diagnostic subgroup- psychoses (n=36)				
Age	0.278	0.156	1.022	0.989-1.538
Sex (male versus female)	0.501	0.076	1.035	0.932- 1.103
Total duration of psychotropic medication received (months)	0.237	1.429	1.671	1.056- 6.897
Number of comorbid medical illness	1.256	1.356	3.812	0.512- 8.543
Number of current psychiatric medications	1.141	1.519	2.031	0.432- 9.989
BMI	0.381	0.156	1.573	0.959- 1.589
Constant	-11.460	3.236		
C. Binary logistic regression analysis for broad diagnostic subgroup- affective disorders (n=62)				
Age	0.015	0.074	1.015	0.878-1.175
Sex (male versus female)	0.827	0.876	1.438	1.079-2.437
Age at onset	0.088	0.075	1.916	1.791-2.060
Number of comorbid medical illness	0.277	0.673	1.758	1.203-2.834
Total duration of psychotropic medication received (months)	0.032	0.022	1.969	1.928-2.012
Total number of current psychiatric medications	0.015	0.634	1.985	0.285-3.412
Duration of physical activity (minutes)	0.003	0.017	1.003	0.970-1.037
BMI	2.554	0.986	1.178	1.011-1.537
Constant	7.896	2.631		

Association significant when p<0.05.

Table 2 A and B present the relationship of prevalence of MS as per IDF criteria with clinical variables and locality. Subjects with MS had higher age (males>females), higher age at onset of the psychiatric disorder (male>female), longer time since onset (only among females), total number of comorbid medical illness (male>female), total months of psychotropic medications received (only among females), greater waist circumference (male>female), greater serum triglyceride level (male>females), fasting blood sugar level (female>male),

higher body mass index (female>male), higher weight (only in females), elevated systolic blood pressure (only among females) and diastolic blood pressure (female>male); total number of psychotropic medications received by the patient, duration of physical activity, high density lipids and height did not differ across genders for the presence or absence of the MS. In addition, the prevalence of MS was higher in those with a rural background and with preponderance in females (80% versus 20%).

Table 3 presents the results of the binary logistic regression for the whole study population and different diagnostic groups. The models were constructed as explained earlier. BMI was significantly positively correlated with presence of MS in all the groups except for psychoses where it approached significance. In other words, with each unit increase in BMI, the likelihood of the patient having MS increased in a statistically significant manner in the whole population and in patients with affective disorders. Other dependent variable which were found to be significantly positively correlated with the presence of MS in whole study population were- age, age at onset, duration since onset, number of comorbid medical illness, duration and number of psychotropic medications received, and depressive disorders. A further sub analysis revealed that those with a BMI ≥25 were 16% more likely to have MS than those without.

DISCUSSION

The sociodemographic details of the study population revealed no significant gender differences except for marital status and occupation. Women being married more often than men may be due to, men with mental illnesses were less likely to be married than women with mental illness. Majority of the women were housewives as expected in this part of country.

Table 4: Prevalence and correlates of MS in patients with psychiatric disorders in Indian studies.[20-29]

Authors and year of publication	Sample population	Criteria used	Prevalence of MS	Correlates of MS
Mattoo et al, 2010[20]	90 inpatients with primary psychiatric disorder	IDF criteria	37.8% (male-29.8%, female-46.5%)	Body mass index (BMI)
Gautam et al, 2011[21]	Prospective interventional study involving 120 indoor and outdoor patients suffering from schizophrenia	ATPIII criteria	11.66% of the patients developed metabolic syndrome after 4 months of antipsychotic medication	SGA>FGA, olanzapine had maximum potential to cause metabolic syndrome
Grover et al, 2012[22]	227 patients with schizophrenia	IDF & NCEP ATPIII criteria	43.6% as per IDF & 44.5% as per NECP ATPIII criteria	Age more than 35 years, female gender, urban locality, being employed and BMI more than 25
Grover et al, 2012[23]	200 patients with bipolar disorder	IDF & NCEP ATPIII criteria	40% as per IDF & 41% as per NECP ATPIII criteria	Not available
Grover et al, 2014[24]	143 inpatients with schizophrenia	NCEP ATPIII and IDF criteria	36.4%	Not available
Grover et al, 2014[25]	126 inpatients with schizophrenia and 72 inpatients with bipolar disorder	NCEP ATPIII and IDF criteria	Bipolar group: IDF -55.5%, NCEP ATPIII – 62.5%; Schizophrenia group: IDF-341%, NCEP ATPIII- 36.5%	Not available
Agarwal et al, 2016[26]	50 drug naïve patients each having RDD and bipolar depression	NCEP ATPIII criteria	RDD-26% bipolar depression- 24%	Not available
Malhotra et al, 2016[27]	102 patients with BPAD and 72 patients with schizophrenia	Consensus definition, 2009	BPAD- 42.2% Schizophrenia- 38.4%	Level of functioning in schizophrenia group
Das et al, 2017[28]	75 patients with schizophrenia	IDF criteria	29.3%	Female gender, smoking, family history of chronic lifestyle disease, and atypical antipsychotic use significantly predicted MS
Hussain et al, 2017[29]	213 inpatients with primary psychiatric diagnoses	NCEP ATPIII criteria	34.74% (male-28.5%, female- 43.3%)	Age, SGA

Abbreviations: SGA= second generation antipsychotics; FGA= first generation antipsychotic; RDD= recurrent depressive disorder; BPAD= bipolar affective disorder

Three studies in general populations in South India have reported a prevalence of 41%, 25.8%, and 28.9% respectively for MS.[10-12] Indian studies have reported a prevalence of MS ranging from 24% to 62.5% in patients with psychiatric disorders (both inpatient and outpatients) depending upon the criteria used and diagnostic category considered (Table 4).[20-29] Index study has found a prevalence of MS of 39%, 34.6%, and 46.7% in whole population, male and female subgroups respectively. This prevalence falls within the range reported in various Indian studies. A trend of female preponderance for the prevalence of MS was noted across different diagnoses for entire study population as well as in severe mental illness group except in neurotic, stress related and somatoform disorders Other Indian studies have also reported a higher prevalence of MS in female population.[20-29]

Our study found a prevalence of MS of 8%, 4%, and 32.6% in psychoses, bipolar disorder and unipolar depression subgroups respectively. The clinical antipsychotic trials of intervention effectiveness (CATIE) by McEvoy et al reported the prevalence of MS as per updated ATP III criteria for schizophrenia at 42.7%.[33] Another study on patients with unipolar depression found a prevalence of MS to be 50% and associated with female gender.[34] A meta-analysis involving bipolar disorder patients found an overall MS rate of 37.3%.[18] Indian studies have reported a prevalence ranging from 29.3%-44.5%, 24%-62.5% and 26% for schizophrenia, bipolar disorder and unipolar depression respectively.[20-29] The lower prevalence of MS in psychoses and bipolar group in our study could be due to lower number of bipolar disorder patients included in the final sample and also lower number of schizophrenia and bipolar disorder patients qualifying for the criteria for MS, which again could be due to multiple factors e.g. younger age, recent onset of illness, and shorter duration of psychopharmacotherapy.

In current study, subjects with MS had higher age, higher age at onset of the psychiatric disorder, longer time since onset of illness, total number of comorbid medical illness, total months of psychotropic medications received, higher weight, and higher BMI. We also found that except for HDL levels, the other 4 components of MS (waist circumference, TG levels, FBS, elevated blood pressure) significantly differentiated those with MS from those without. Indian studies have reported BMI, age, female gender, urban locality, smoking, family history of chronic lifestyle disease, level of functioning and use of second-generation antipsychotics to be significantly associated with MS.[20-29] From that perspective, our study adds to the existing knowledge and emphasizes the importance of age at onset, time since onset, presence of comorbid medical illness and duration of psychotropic medications received in predicting MS. A BMI ≥25 was found in 39% patients with MS and they were significantly more likely to have MS than those without. Considering these facts, a measurement of height, weight and waist circumference should be a part of initial assessment of all psychiatrically ill patients especially if they are female and, in the 4th, or later decades of life. All those approaching higher BMI's should be evaluated for MS, advised to increase physical exercise, and adopt healthier dietary habits.

There were certain limitations of our study. The cross-sectional nature of the study precluded the inference of causal pathway of MS. The sample was taken from the psychiatry outpatient department of a tertiary care center, thus limiting its generalizability to patients with psychiatric disorders in the community. Despite these limitations this study underlines the need for further research with prospective design and larger samples to determine the prevalence and correlates of MS in psychiatric patients.

CONCLUSION

MS is common among subjects with psychiatric disorders and the prevalence of MS in our sample is consistent with the findings reported in literature. Our study also emphasizes the importance of age at onset, time since onset, presence of comorbid medical illness and duration of psychotropic medications received in predicting MS. Based on the finding of our study, it can be recommended that all patients with psychiatric disorders should be routinely screened for the presence of MS. Early diagnosis and treatment of MS in this susceptible population may avert many adverse cardio-vascular events.

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