Original Article

Metabolic Syndrome in Patients with Schizophrenia

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ABSTRACT

OBJECTIVE: To determine frequency of metabolic syndrome in patients with Schizophrenia, in a tertiary care armed forces setup.
STUDY DESIGN: Cross sectional study.
PLACE AND DURATION: Department of Psychiatry, PNS SHIFA, Karachi from October 2009 to April 2010.
MATERIALS AND METHODS: Fifty six patients with Schizophrenia reporting for management in PNS SHIFA were enrolled as subjects. Demographic variables and other confounding variables were recorded in a structured Performa, Blood Pressure (BP) and Waist Circumference (WC) were measured while Fasting Plasma Glucose (FPG), Triglycerides (TAG) and HDL-Cholesterol (HDL-C) levels were estimated by routine methods in laboratory with quality assurance.
RESULTS: More than half i.e.30 (53.6%) of subjects had Metabolic Syndrome (MS) as per ATP III-A criteria. Further 25% (n=14) of subjects were positive for two components of MS. Low HDL-C levels were most prevalent component followed by hyperglycaemia, hypertriglyceridemia and increased WC while hypertension was least common component.
CONCLUSION: Metabolic Syndrome and its various components are frequently co morbidity in patients with Schizophrenia.

KEYWORDS: Schizophrenia, Diabetes Mellitus, Hypertension, Metabolic Syndrome.

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INTRODUCTION

Psychiatric illness not only increase the physical co morbidity due to lack awareness and lack of activity but also increases the mortality of the patients suffering from psychiatric illness[1,2]. Many of the life style disorders like hypertension, smoking, diabetes mellitus (DM), hypercholesterolemia, physical under activity and obesity are the major contributor to premature mortality in patients with severe mental illness[3,4]. These risk factors are collectively lead to Metabolic Syndrome (MS).

It has been found that patients with MS have three folds increased risk of cardiovascular morbidity and 6 times risk of mortality[5]. There are many definitions of MS being used by different associations namely National Cholestrol Education Program and American Heart Association. Their definitions are known as Adult Treatment Panel III and III A respectively[6,7]. According to these definitions a minimum of three out of 5 criteria must be fulfilled to diagnose a patient suffering from MS. These criteria are:1waist circumference of more than 102cm in males and 85cm in females, 2 triglyceride levels of more than 1.7mmol/l, 3 HDL less than 1.3mmol/, 4 blood pressure of more than 135/85 mm (Hg), 5 fasting blood sugar level more than 6.1mmol/m as per ATP-III and more than 5.6mmol/l as per ATP-IIIA[6].

Overall prevalence of the MS varies; 21.8% in the United States, 27% in India and 30% in European countries[5,8]. In patients with schizophrenia and Bipolar Affective Disorder higher prevalence has been reported i.e. 63% and 51% respectively[8]. In Belgium, a prospective study revealed prevalence of MS to be 32.3% amongst patients of schizophrenia. In a large, cross-sectional study, conducted in women with depression it was revealed that frequency of MS in younger women with depression was double as compared to healthy females. McEvoy et al reported a higher incidence of MS in women (51.6%) than men (36%). Similarly patients with psychotic disorders like schizoaffective disorder have also been found to have high prevalence of MS[10]. Racial differences have also been reported in prevalence of MS; African American have less incidence of MS as compared to Caucasian men[11]. Many established risk factors which contribute to greater incidence of MS in patients with Schizophrenia are lack of physical activity, smoking, malnutrition, obesity, poor knowledge about maintenance of physical health and lack of access to medical care[12]. Antipsychotic medications especially newer or atypical antipsychotics are also linked with increased incidence of MS[2]. Life time prevalence of Schizophrenia is also on the rise which further highlights the significance of MS. Little work has been carried out on MS in psychotic patients in Pakistan and no study has been conducted which solely encompasses this issue

of the modern era. Timely evaluation of this comorbidity and its subsequent management can help in reducing the sufferings as well as the societal and economic costs of the mentally ill.

MATERIAL AND METHODS

Study was conducted at Department of Psychiatry in collaboration with Department of Chemical Pathology, PNS SHIFA Hospital, Karachi between October 2009 and April 2010. Fifty six patients with schizophrenia who presented to the out-patient clinic of Psychiatry Department during this period were included in the study. Demographic information like age and gender was noted, clinical data of these patients were recorded, which included waist circumference and blood pressure, early morning fasting blood samples were drawn for estimating FPG, HDL-C and TAG levels at Pathology Department using the routine laboratory methods. Quality assurance standard was maintained by Consultant Chemical Pathologist. ATP-IIIA definition of MS was used to diagnoseMS in the study population and cut off levels of different markers were fasting plasma glucose ≥5.6 mmol/L or taking anti-hyperglycemic medication, triglyceride levels ≥1.7 mmol/L, HDL-C <1.03 mmol/L for men and <1.3 mmol/L for women, BP ≥130/85 mm Hg or taking antihypertensive medication, and waist circumference >102 cm for men and >88 cm for women.

Statistical Analyses were conducted using Statistical Package for Social Sciences version 13.0. Mean and standard deviations were obtained for continuous variables like age of patients, illness duration, and MS criteria, Frequencies were measured for categorical data like gender of the patients, MS, positive criteria, stratified age and duration of illness. Relevant and pertinent results are mentioned. Statistical comparison of lipid profile was performed by using student t- test in cases and controls. A p- value <0.05 was considered significant in all statistical analyses.

RESULTS

In the study 77% were male patients while the mean age of the patients was 39.19 ± 12.73 years. MS was quite common in our subjects 53.6% (n=30) according to ATP III-A. The frequency of MS was relatively higher among male patients than females (55.8% and 46.2%, respectively). Low HDL-C level was the commonest positive MS criteria (Table I). High frequency

TABLE I: FREQUENCY OF MS AND ITS DIFFERENT CRITERIA ACCORDING TO GENDER OF PATIENTS

	All Patients (n=56)		Male (n=43)		Female (n=13)	
	N	Percent	N	Percent	N	Percent
Metabolic Syndrome	30	53.6%	24	55.8%	6	46.2%
Type of Drug Treatment						
Typical	10	17.9%	8	18.6%	2	15.4%
Atypical	37	66.1%	26	60.5%	11	84.6%
Combination	9	16.1%	9	20.9%	0	0.0%
High Density Lipoproteins	53	94.6%	40	93.0%	13	100.0%
Fasting Blood Sugar	28	50.0%	26	60.5%	2	15.4%
Serum Triglycerides	23	41.1%	14	32.6%	9	69.2%
Waist Circumference	17	30.4%	9	20.9%	8	61.5%
Blood Pressure	4	7.1%	1	2.3%	3	23.1%
Total Criteria Positive						
0	2	3.6%	2	4.7%	0	0%
1	10	17.9%	6	14%	4	30.8%
2	14	25%	11	25.6%	3	23.1%
3	24	42.9%	19	44.2%	5	38.5%
4	5	8.9%	5	11.6%	0	0%
5	1	1.8%	0	0%	1	7.7%

of increased central obesity, elevated triglyercride levels and low HDL-C in females while low HDL-C and higher FPG in males were particularly noteworthy. When we looked at the positive criteria rate, we found that 25% patients satisfied two criteria and were not diagnosed with MS. None of the male patients in the present study satisfied all the five diagnostic criteria for MS, however, there was 1 such female patients in our study group. Although majority of patients i.e.66.1% (n=37) were using atypical antipsychotic drugs, however, there were no differences in the frequency of MS with type of drugs as 66.7% of patients using atypical antipsychotics and 65.4% of patients using older or typical antipsychotic medications had MS. Mean age of the patients with MS was 37.67 ± 13.37 years, which was lesser than the mean age of the patients without MS diagnosis (40.96 ± 11.95 years). Mean duration of illness was 14.57 ± 10.81 years. Illness duration of patients with MS (14.16 ± 10.33 years) was also lesser than in patients without MS (15.03 ± 11.53 years). The mean values for age and MS diagnostic criteria are shown in Table II. Mean WC of the female patients (96.92 ± 14.64 cm) was high according to ATP III A definition, whereas the mean value in males was less than that. Mean HDL_C level was high in females (0.99 ± 0.10) as compared to males (0.93 ± 0.08). Mean TAG level was higher in males (2.89 ± 3.30) than females (1.67 ± 0.99). Mean FPG level in males was very higher (8.41 ± 5.42) than females (5.00 ± 1.65) (Table II). More than two thirds

TABLE II: MEAN VALUES OF AGE, DURATION OF ILLNESS AND MS CRITERIA OF PATIENTS

	All Patients (n=56)		Male Patients (n=43)		Female Patients (n=13)	
	Mean	SD	Mean	SD	Mean	SD
Age of The Patient	39.19	12.72	38.62	13.26	41.07	11.04
No of Years in to Illness	14.57	10.81	13.93	11.44	16.69	8.46
High Density Lipoproteins Level	0.94	0.09	0.92	0.08	0.99	0.10
Fasting Blood Sugar Level	7.62	5.01	8.41	5.42	5.00	1.65
Triglyceride Level	2.60	2.97	2.88	3.30	1.67	0.99
Waist Circumference in cm	91.69	13.53	90.11	12.95	96.92	14.64

TABLE III: FREQUENCY OF MS ACCORDING TO AGE OF PATIENTS AND DURATION OF ILLNESS

Age (years)	All Patients (n=56)		Male (n=43)		Female (n=13)	
	N	Percent	N	Percent	N	Percent
18-30 (n=18,m=15,f=3)	12	66.7%	11	73.3%	1	33.3%
31-45 (n=20,m=14,f=6)	9	45.0%	6	42.9%	3	50.0%
46-60 (n=17,m=13,f=4)	8	47.1%	6	46.2%	2	50.0%
>60 (n=1,m=1,f=0)	1	100.0%	1	100.0%	0	0.0%
Duration of Illness (years)						
0-5 (n=15,m=13,f=2)	7	46.7%	7	53.8%	0	0.0%
6-10 (n13=,m=12,f=1)	8	61.5%	7	58.3%	1	100.0%
11-15 (n=8,m=5,f=3)	5	62.5%	4	80%	1	33.3%
16-20 (n=5,m=1,f=4)	3	60%	0	0.0%	3	75.0%
>20 (n=,15m=12,f=3)	7	46.7%	6	50.0%	1	33.3%

of patients between 18 and 30 years of age had MS, while frequency of MS was less than 50% in patients that were older than 31 years (Table III).

DISCUSSION

In our study frequency of MS is 53.6% according to ATP III-A criteria which was higher than previously reported in American and Belgian general populations but slightly less than those reported by De Hert MA et al[8] in patients of schizophrenia demonstrating a similarity in frequency of MS in schizophrenic patients. HDL-C was the commonest observed criteria in our patients. In males HDL-C and FPG were the commonest while in females WC and TAG were more common fulfilling criteria. This can be due to the fact that obesity has differential effects on pathogenic mechanisms underlying glucose homeostasis and it is not mandatory to have all parameters deranged with obesity. Another reason can be less cut off limit of waist circumference for females i.e. 88cm as compared to 102cm for males in ATP-III A criteria for compared patients with MS to those without MS. In terms of demographic and clinical characteristics, we found that the patients with MS had lesser mean age, which is in line with earlier reports in the literature[13,14,15]. In the cited studies the relationship between age and MS did not reach the level of statistical significance.[16] similarly in the present study we found that the frequency of MS was 66% in younger patients but was less than 50% in patients older than 30years of age. Yazıcı et al (2005) found that the frequency of MS was 37% among men under the age of 30 years and 14.3% among those between 30 and 39 years. MS was more prevalent in men but the rate did not reach the level of statistical significance. Illness duration of patients with MS was shorter than those, without MS. This was one of very important finding of our study. It is known that frequency of MS increases with growing age and drug treatment[13] but our result show it otherwise hence suggesting a direct relationship of schizophrenia with metabolic syndrome as co morbidity rather than merely the effect of medicines or growing age. There is growing amount of evidence that atypical antipsychotics especially trigger weight gain and related metabolic changes; however, in the present study medication type did not appear to have any impact on frequency of MS.

CONCLUSION

Metabolic syndrome is quite common in patients with schizophrenia almost double than the general population. It puts already underprivileged population at further risk of hypertension, cardiovascular disorders and diabetes. Schizophrenia and MS appear to be co morbidities to begin with, irrespective of gender of patients, duration of illness, use of medication or type of medication used. Mental health professional need to be cautious while treating these patients and routine screening of these patients for metabolic syndrome should be performed at the beginning of treatment and then six monthly or as described in different prescribing guidelines to help protect the physical health of these patients a large scale study on the subject is recommended.

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