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Prevalence of Metabolic Syndrome in Alcohol Dependence: A Cross-Sectional Study at a Tertiary Care Hospital

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Abstract

Background: Alcohol dependence is one of the most common and untreated mental disorder with an increased risk of cardiovascular mortality and morbidity. Studies in the past have associated Alcohol Dependence Syndrome (ADS) with Metabolic Syndrome (MS) but the results remain inconclusive. Hence the study was planned to access the prevalence of MS in ADS patients.

Aim: To study the prevalence of Metabolic Syndrome among the alcohol-dependent patients.

Settings and Design: A cross-sectional study at a tertiary care hospital.

Materials and Methods: 50 alcohol dependence patients attending psychiatry department of Victoria Hospital, Bangalore Medical College and Research Institute, aged between 18-55 years were enrolled in the study. A Semi structured preform for socio demographic data, medical data including treatment details, ICD-10 Criteria For Alcohol Dependence and Alcohol Use Disorder Identification Test (AUDIT) was prepared. Metabolic Syndrome was diagnosed using NCEP-ATP III criteria.

Statistical analysis: Data was collected and analyzed using descriptive statistics.

Results: The prevalence of Metabolic Syndrome was 14%. Most of the patients were middle-aged, married, hailed from the lower middle class with a rural background. Of the components evaluated for Metabolic Syndrome, it was observed that Systolic blood pressure, Diastolic pressure, Fasting blood sugar, triglycerides and waist circumference were elevated and High density lipoproteins was low.

Conclusion: In the background of increased incidence of cardiovascular risk in patients with ADS, screening this high risk population for metabolic syndrome especially those patients in the ADS who have one or two metabolic abnormalities and to implement effective strategies to halt progress towards a full-blown Metabolic Syndrome in a long run can reduce the cardiovascular mortality.

Keywords: Alcohol dependence syndrome; Metabolic syndrome; Cardiovascular mortality

Introduction

Alcohol Dependence Syndrome (ADS) is a major public health problem. Dependence syndrome is a cluster of behavioural, cognitive and physiological phenomena that develop after repeated substance use. Typically these include a strong desire to take the drug, difficulties in controlling its use, persisting in its use despite harmful consequences, a higher priority given to drug use than to other activities and obligations, increased tolerance and sometimes a physical withdrawal state. The lifetime risk for alcohol dependence is approximately 10%-15% for men and 3%-5% for women, with 1 year prevalence rates of about 6%, figures that are applicable to all socioeconomic and educational levels [1].

Metabolic syndrome is defined by a constellation of interconnected physiological, biochemical, clinical and metabolic factors that directly increases the risk of cardiovascular disease, type 2 diabetes mellitus, and all-cause mortality. It consists of central obesity, impaired glucose tolerance, hypertension, and dyslipidemia. There is good evidence of it contributing to greater risk for type 2 diabetes mellitus and myocardial infarction or cerebrovascular accident [2,3].

Its increasing prevalence in the developing countries is attributed to the increasing affluence of the middle class, urbanization, mechanization, changes in diet and the sedentary habits [4].The relation between metabolic syndrome and alcohol use is complex. Alcohol is reported to have a favorable effect on plasma HDLC levels and insulin sensitivity, a detrimental effect on plasma triglycerides concentration, and may contribute indirectly to the elevation of blood pressure [5-8], whereas the relationship between alcohol and obesity is reportedly inconsistent [9]. Research from America and Europe has

reported the lower prevalence of Metabolic syndrome in populations with moderate alcohol consumption; however, alcohol intake quantification was not standardized [5,7,10]. One study has suggested detrimental effects of alcohol on all the components of metabolic syndrome, except the HDLC levels [11]. Another study of adults in Shanghai reported the lower prevalence of Metabolic syndrome, irrespective of an amount of alcohol consumption [12]. Most of the research on the correlation between alcohol and Metabolic syndrome has included only a few heavy alcohol consuming subjects; only three studies have included alcohol dependent subjects [13-15] and hence the present research aimed to find the prevalence of metabolic syndrome in alcoholdependence syndrome patients.

Aim and Objective

To study the prevalence of metabolic syndrome in patients with alcohol dependent syndrome.

Methodology

The study was conducted at Department of Psychiatry, Victoria Hospital, attached to Bangalore Medical College and Research Institute, Bengaluru. It was a cross-sectional study conducted during October 2014-May 2016. Ethics committee approval was taken.

Sample size was calculated using N=4pq/d2, where p=prevalence and q=1-p.

N=4*0.069*0.931/0,0064=40.14 for 8% of relative precision (d), considering dropouts, the sample size was rounded off to 50 patients

A sample of 50 patients aged between 18-55 years meeting the diagnostic criteria for ADS as per ICD-10 and willing to give written informed consent were enrolled in the study. ICD-10 represents International Statistical Classification of Diseases and Related Health Problems developed by WHO. In that, F 10.2 describes the substance dependence disorders. Patients with Co-Morbid Axis I Psychiatric illness, the co-morbid diagnosis of dependence for other substance use except for tobacco dependence, patients with severe medical illness and those using medications that affect the components of metabolic syndrome (e.g. steroids, antipsychotics) were excluded from the study. The socio-demographic and clinical data were obtained from the patients and reliable attendants through the clinical interview in a semi-structured proforma. Details of concomitant medical disease including diabetes and hypertension were noted. The severity of dependence was assessed using the Alcohol Use Disorder Identification Test (AUDIT).

The components of metabolic syndrome were evaluated using National Cholesterol Education Program-Third Adult Treatment-III (NCEP-ATP III). The revised NCEP criteria require at least three of the components mentioned in **Table 1** for diagnosing metabolic syndrome.

NCEP-ATP III Criteria	Males	Females
Waist circumference (cm)	≥ 80	≥ 90
SBP (mmHg)/DBP (mm Hg)	≥ 130/85	
HDL (mg/dl)	<40	<50
TGL (mg/dl)	≥ 150	
FBS (mg/dl)	≥ 100	

Table 1: The revised NCEP (National Cholesterol Education Program) criteria.

NCEP-ATP III identified the metabolic syndrome as a multiplex risk factor for cardiovascular disease (CVD) that deserves added clinical attention. Physical evaluation included measurement of body weight (kg), height (cm), waist circumference (cm) by a calibrated scale and recording of blood pressure (mmHg). 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 standard mercury manometer, at least two readings at five-minute intervals were taken to measure the BP in a 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 Fasting Blood Sugar (FBS), Serum Triglycerides (TG), and High-Density Lipoprotein (HDL) levels. Patients who were found to have metabolic abnormalities were informed about the same and were explained about the need for lifestyle modifications, and were referred for specialist care whenever required.

Data was collected and analysed. Continuous variables were represented as mean SD and categorical variables were expressed in percentage/proportions.Data were analysed using descriptive statistics.

Results

The socio-demographic data of the study population are depicted in **Table 2**. Majority of the patients belonged to the age group of 26-40 years, with a mean age of 39 years, all were men, and most were married. Only a minority were educated beyond pre-university. Nearly half were farmers and unskilled workers with a majority being Hindus.

Age	
<25 years	05 (10.0%)
26-35 years	13 (26.0%)
36-45 years	17 (34.0%)
46-55 years	15 (30.0%)
Gender	
Male	50 (100%)
Female	-
Religion	
Hindu	45 (90.0%)
Muslim	45 (90.0%)

Christian	01 (02.0%)
Locality	
Urban	22 (44%)
Rural	28 (56%)
Marital status	
Married	45 (90%)
Single	05 (10%)
Education status	
Illiterate	10 (20%)
Able to sign and primary	15 (30%)
High school, pre-university, and diploma	22 (44%)
Graduate and postgraduate	03 (06%)
Occupation	
Unemployed and student	2 (4%)
Farmer and unskilled	16 (32%)
Semiskilled, skilled and clerical	27 (54%)
Professional	3 (6%)
Business	02 (4%)

Table 2: Socio-demographic data of the study population.

The prevalence of MS among alcohol-dependent patients was 14%. Physical and laboratory examination findings of the study population **(Table 3 and Figure 1)**.

Variables	MS (Yes-07, No-43)	Mean ± SD
Body Mass Index	Yes	26.22 ± 4.054
	No	22.24 ± 4.171
Systolic BP	Yes	131.71 ± 6.873
	No	122.93 ± 10.405
Diastolic BP	Yes	90.00 ± 7.303
	No	80.93 ± 8.331
Waist Circumference	Yes	87.71 ± 12.763
	No	80.63 ± 8.680
Triglycerides	Yes	193.43 ± 98.363
	No	138.98 ± 50.859
High Density Lipoproteins	Yes	33.86 ± 5.610
	No	44.93 ± 14.168
Fasting Blood Sugar	Yes	112.57 ± 17.300
	No	88.00 ± 10.858
Age 1st Drink	Yes	22.86 ± 2.268
	No	20.65 ± 4.503
Age of dependency	Yes	39.86 ± 9.045
	No	31.05 ± 8.097
No of units of Alcohol	Yes	21.43 ± 8.018
	No	22.60 ± 9.477
AUDIT	Yes	25.71 ± 3.302
	No	26.49 ± 4.205

Table 3: Mean and SD of for variables assessed amongst patients with ADS.

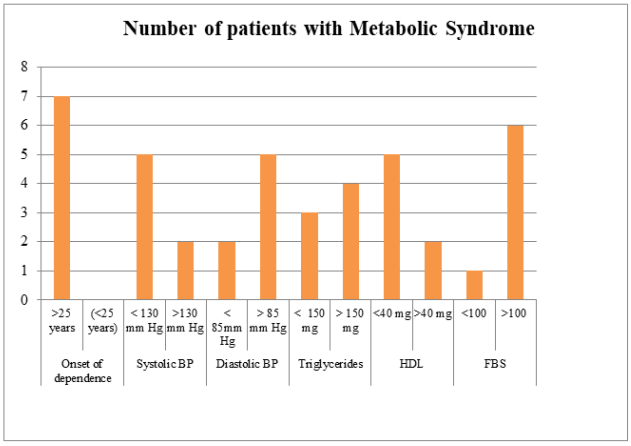

Figure 1: Variables with the components of metabolic syndrome.

HDL was low and FBS, serum triglycerides were high in alcohol-dependent patients with MS. There was a significant variation in waist circumference and BMI when compared between ADS patients with metabolic syndrome and ADS patients without metabolic syndrome.

It was also observed in the study that amongst patients with ADS and MS the age of 1st drink, an age of dependency and the AUDIT score was numerically higher when compared to ADS without MS patients.

Discussion

The global status report published by WHO in 2009 [16] states that: In 2010 Worldwide consumption was equal to 6.2 liters of pure alcohol consumed per person aged 15 years or older, which translates into 13.5 grams of pure alcohol per day. A quarter of this consumption (24.8%) was unrecorded, i.e., homemade alcohol, illegally produced or sold outside normal government controls. Of total recorded alcohol consumed worldwide, 50.1% was consumed in the form of spirits. Worldwide 61.7% of the population aged 15 years or older had not drunk alcohol in the past 12 months. In all WHO regions, females are more often lifetime abstainers than males.

A meta-analysis revealed an overall prevalence of 6.9 per 1000 for Indian with urban and rural rates of 5.8 and 7.3 per 1000 population. The rates among men and women were 11.9 and 1.7 respectively [17].

As a prevalent condition and predictor of disease across race, gender, and age groups, the metabolic syndrome provides a unique opportunity for identifying high-risk populations and preventing the progression of some of the major causes of morbidity and mortality. As clinical practitioners, we can screen this high-risk population for metabolic syndrome components especially those patients in the ADS group who have one or two metabolic abnormalities hence the above study was planned.

In the present study, the prevalence of metabolic syndrome was 14% [18]. On metabolic syndrome among substance dependent men concludes that the prevalence rate of MS at 14% in the present study was within the range of 5%-31% reported for subjects taking alcohol by the Western studies [19-27]. In our study, the prevalence of MS was found to be highest in the alcohol-dependent group and it was also in the range of MS reported earlier [19-27]. In contrast, the rate of 27% for MS found in the present study is lower than that reported by two community based cross-sectional studies done in our similar catchment areas on general population, where prevalence of MS was recorded in 45.3% and 39.5% by modified NCEP ATPIII and IDF criteria respectively in one study [28,29] and in 47% by IDF criteria in the other study. This concludes that even larger quantity of alcohol consumption is associated with lower prevalence of MS at least in this part of the world. However, this finding must not overshadow the increased morbidity and mortality associated with alcohol dependence.

A study [30] concludes that the prevalence of the metabolic syndrome was 20.8% in men and 26.9% in women. Alcohol consumption had a significant inverse relation with the odds ratio for low HDL cholesterol in all alcohol groups. Heavy alcohol consumption (30 g/d) was associated with significantly higher odds ratios for high blood pressure and high triacylglycerol in men and high fasting blood glucose and high triacylglycerol in women. Odds ratios for the metabolic syndrome and its components tended to increase with increasing alcohol consumption. This concludes that although alcohol consumption had a significant inverse relation with the odds ratio for low HDL cholesterol in all alcohol groups, an increasing dose-response relation was found between alcohol consumption and the odds ratio for the metabolic syndrome. This might be due to the opposite relation of alcohol consumption to other components of the metabolic syndrome.

A study [31] on Alcohol Consumption in the Severely Obese in relationship with the Metabolic syndrome states that light-to-moderate alcohol consumption is associated with a lower prevalence of type 2 diabetes, reduced insulin resistance, and more favourable vascular risk profile in the severely obese.

It was found that there is a high incidence of Metabolic syndrome in patients with ADS. Patients would benefit immensely from increased awareness on part medical professionals about the metabolic syndrome its components. This awareness would enable timely focusing of the patient for a metabolic profile leading to better intervention and improved quality of life for the patient. This study assessed metabolic syndrome and its variables, socio-demographic variables and their correlation among patients with ADS and has attempted to study the prevalence of MS among the ADS patients. The findings of this study suggest further studies for better understanding. The present study was done in a tertiary hospital in an urban setting and hence the results cannot be generalized to the population at large, small sample size and regression analysis to find the association of variables included in the study with MS in ADS was not done.

Conclusion

The aim of the study was to assess the prevalence of metabolic syndrome among patients with Alcohol Dependence. Results from this study highlight the prevalence of metabolic syndrome among patients with alcohol dependence and the need for awareness among medical professionals. There is the need for general population-based studies to find the co-relation between metabolic syndrome and alcohol dependence.

In the background of increased incidence of cardiovascular risk in patients with ADS, screening of high-risk population for metabolic syndrome especially those patients in the ADS who have one or two metabolic abnormalities and to implement effective strategies to halt progress towards a full-blown MS in a long run can reduce the cardiovascular mortality

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