Original Article

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Medical Professionals at High Risk for Metabolic Syndrome

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Abstract

Objectives: Metabolic syndrome conveys significant risk for future atherothrombotic cardiovascular events and has important correlation with the working environment. So, we aimed to see prevalence of metabolic syndrome among medical professionals of Bikaner, Rajasthan. *Material and Methods:* It is a cross sectional study. We recruited 390 (180 doctors and 210 paramedical staff) medical professionals. Detailed physical and laboratory examination were done. Data was collected in a proforma having questionnaires about physical activity, job stress, sleeping hours, working hours, alcoholism and smoking habits. IDF Criteria in Indian Reference were used to reveal prevalence of metabolic syndrome. Correlation with multistep regression analysis and coefficient of contingency were derived from the results. *Results:* The overall prevalence of metabolic syndrome is 47.95% while according to gender that is 49.19% and 43.37% in females and males respectively. The prevalence in doctors is 50.56% and in paramedical staff is 45.71%.The prevalence of various abnormal components of metabolic syndrome is as: waist circumference (51.28%), FBS (26.15%), SBP (36.97%), DBP (21.79%), HDL (46.92%), and TG (51.28%). The coefficient of contingency of physical inactivity and job stress is 0.30263 and 0.26278 respectively. *Conclusion:* Prevalence of metabolic syndrome is very high in medical professionals while physical inactivity and job stress are the most important risk factors.

Keywords: Metabolic Cardiovascular Syndrome; Dyslipidemia; Hospital Medical Staff; Central Obesity.

Introduction

Metabolic syndrome, a clustering of metabolic abnormalities, has been found to convey a significant risk for future atherothrombotic cardiovascular events. Metabolic syndrome includes high blood pressure, elevated triglycerides, low high-density lipoprotein (HDL), impaired fasting glucose, and excess abdominal fat. Metabolic syndrome is not a new condition and was first described in the 1920s by Kylin, a Swedish physician. The term "Metabolic Syndrome" was coined in1977 by Haller [1] while reporting associations of obesity, diabetes mellitus, hyperlipoprotenemia, hyperuricemia and steatosis hepatis. It is also known as syndrome "x', insulin resistance syndrome.

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Globally, Metabolic Syndrome has become a public health concern and is a major cause of morbidity and mortality. Previously it was estimated that 20%-25% of south Asians have developed metabolic syndrome and many more may be prone to it [2,3]. In South Asian countries, rapid increase in western fast food outlets, sale of aerated sweet drinks and increased consumption of fried snacks is being commonly seen. In addition, South Asians are less physically active, and sedentary lifestyle is increasing. Further, migration from villages to cities is increasing. These intra-country migrants become urbanized, mechanised, resulting in nutritional imbalance, physical inactivity, stress, and increased consumption of alcohol and tobacco [4].

Little information exists on prevalence of metabolic syndrome in India and especially in professional workers. The working population represents a large proportion of the general population. The employees spend most of the time of their life in their working place. The working authorities are directly affected by working efficiency and the individual nation's development is affected indirectly. Hospitals are an ideal environment to collect and disseminate information on quality of life and cardiovascular risk factors. Hospital workers are influenced by their work environment and also have a role as educator. In health care services the value of metabolic syndrome derives largely from its potential to reduce the risk of cardiovascular disease in the general population by treating the disease. So we planned to study the prevalence of metabolic syndrome in medical professionals of Bikaner, Rajasthan.

Material and Methods

This was a cross-sectional epidemiological study investigating prevalence of metabolic syndrome among medical professionals working in S.P. Medical College & Associated Group of PBM Hospitals and other hospitals in Bikaner. 390 Participants (180 doctors and 210 paramedical staff members) were recruited by calling all of them in diabetic Care & Research Centre. All participants were more than 30 years of age and following points were excluded before their entry in study.

- Seriously ill patient
- Long term corticosteroid therapy
- Hypothyroidism
- Spine deformity
- Ascites due to any cause
- Nephrotic syndrome
- Pregnant females
- Lactating mothers

The data were collected on a specially designed proforma having multiple questionnaires describing baseline demographic profile, personal habits and physical exercise (IPAQ protocol) [5], job stress [6], work load and sleep pattern. Participants underwent detailed physical and laboratory testing. Waist was measured at midpoint between lower rib margin and iliac crest while systolic and diastolic blood pressures were measured in right arm supine position. The average of the two anthropometric measurements was applied in the present study. Laboratory measurements were done after at least 8 hours of fasting. Two ml. of venous blood sample was collected to estimate blood glucose and lipid profile levels. Blood glucose was measured by glucose oxidase method and lipid profile by "Stat Fax$^{(R)}$ 3300" analyzer.

International Diabetes Foundation criterion for metabolic syndrome were used with waist circumference of ≥ 90cm for males and ≥ 80cm for females being obligatory plus two or more of following:

I. Fasting triglycerides >150mg/dl or specific medication
II. HDL cholesterol < 40mg/dl and < 50mg/dl for males and females, respectively, or specific medication.
III. Blood pressure >130mm systolic or > 85mm diastolic or previous diagnosis or specific medication
IV. Fasting plasma glucose ≥ 100mg/dl or previously diagnosed type 2 diabetes.

Statistical Analyses

Analyses were completed using SUDANN (version 8.0) to take into account sample weights and design effects. Correlation coefficient and coefficient of contingency were derived while multiple logistic regression analyses were also applied.

Observations

In our study overall prevalence of metabolic syndrome is 47.95% while 50.56% in doctors while 45.71% in paramedical staff separately.

Prevalence in different age groups is 40.79% in ≤ 45 years; 57.04% in 46 -59 years and 73.91% in ≥ 60

years (Figure 1). The prevalence is more in doctors than paramedical staff in each age group. Prevalence in females is 49.19% while in males is 47.37%. Increased waist circumference, abnormal SBP, abnormal DBP, increased FBS, increased triglyceride and deranged HDL are in 51.28%, 36.97%, 21.79%, 26.15%, 51.28% and 46.92% cases respectively (Table 1). Physical inactivity and job stress are the most common risk factors to be associated with prevalence of metabolic syndrome; their coefficient of contingency is 0.30263 and 0.26278 respectively (Table 2). Working duration, sleeping duration and alcoholism have also important relations while smoking is not found to be associated significantly. Multiple logistic regression analysis (Table 3, graph-2) revealed that mostly variables were strongly associated with age. The most significant correlation was seen when dependent variable is DBP and independent variables are age+ waist+ SBP, which is 0.77 and 0.632 in doctors and paramedical staffs respectively.

Table 1: Distribution of Prevalence of components of Metabolic Syndrome in Medical Professionals

Variables	Profession		Overall Prevalence
	Doctor	Staff	
Waist Circumference (M≥90cm; F≥80cm)	97 (53.89%)	103 (49.05%)	200 (51.28%)
FBS ≥100mg/dl	44 (24.44%)	58 (27.62%)	102 (26.15%)
Systolic BP > 130mm Hg	70 (38.89%)	74 (35.24%)	144 (36.97%)
Diastolic BP > 85mm Hg	45 (25%)	40 (19.05%)	85 (21.79%)
HDL (M:<40; F:<50 mg/dl)	83 (46.11%)	100 (47.62%)	183 (46.92%)
Triglyceride> 150mg/dl	100 (55.56%)	100 (47.62%)	200 (51.28%)

M: Males; F: Females.

Table 2: Correlation of various risk factors with prevalence of metabolic syndrome

Risk factor	X^2	p-value	Coefficient of contingency
Job stress	28.93	p<0.001	0.26278
Physical activity	39.32	p<0.001	0.30263
Sleeping habit	17.6	p<0.001	0.20779
Working habit	19.92	p<0.001	0.22044
Smoking	0.17	p>0.5	0.02087
Alcoholism	15	p<0.001	0.19245

Table 3: Multiple stepwise Regression analysis

Independent Variables	Depended Variable	R^2 Doctor	R^2 Staff
Age	Waist	0.135*	0.03
Age+Waist	SBP	0.130*	0.28*
Age+Waist+SBP	DBP	0.77*	0.632*
Age+Waist+SBP+DBP	FBS	0.101*	0.159*
Age+Waist+SBP+DBP+FBS	TG	0.299*	0.379*
Age+Waist+SBP+DBP+FBS+TG	HDL	0.49*	0.350*
Age+Waist+SBP+DBP+FBS+TG+HDL	TC	0.119*	0.247*
Age+Waist+SBP+DBP+FBS+TG+HDL+TC	LDL	0.18*	0.075

ANOVA test is applied to test the regression relation
* Correlation is significant at 0.001 level

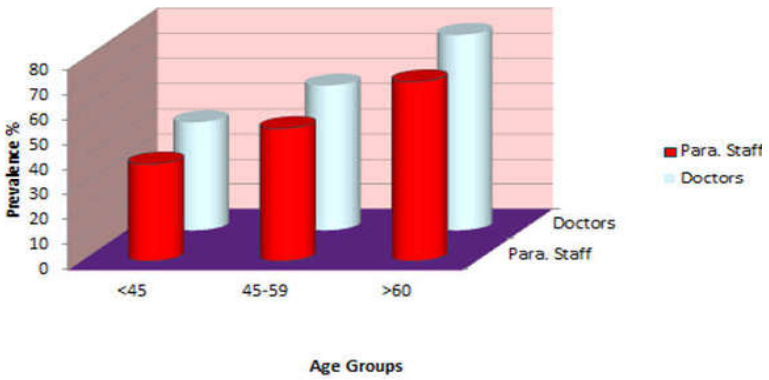
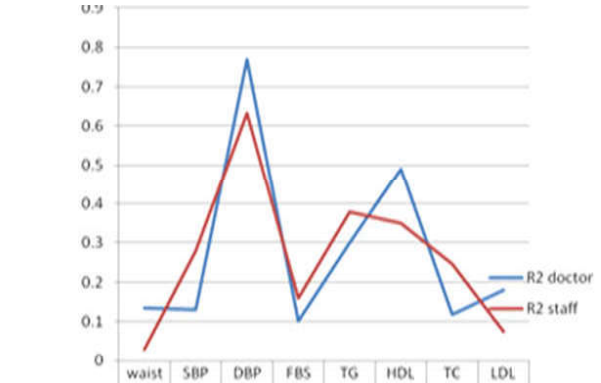


Fig. 1: Plevalence of metabolic syndrome A/c to age groups and profession



	waist Age	SBP Age+ waist	DBP Age+ waist+ SBP	FBS Age+ waist+ SBP+D BP	TG Age+ waist+ SBP+D BP+FB S	HDL Age+ waist+ SBP+D BP+FB S+TG	TC Age+ waist+ SBP+D BP+FB S+TG+ HDL	LDL Age+ waist+ SBP+D BP+FB S+TG+ HDL+T C
R2 doctor	0.135	0.13	0.77	0.101	0.299	0.49	0.119	0.18
R2 staff	0.03	0.28	0.632	0.159	0.379	0.35	0.247	0.075

Fig. 2: Correlation of various risk factors with prevalence of metabolic syndrome

Discussion

In our study overall prevalence of metabolic syndrome is 47.95%. The prevalence of metabolic syndrome is more common in doctors versus paramedical staff; females versus males and increases with age. The prevalence of metabolic syndrome is much more than the general population. Prasad et al found prevalence of metabolic syndrome to be 33.5% in a community study from urban eastern India [8]. Thiruvagounder et al observed 33.17% of males and 27.04% of females to be satisfying the criterion for metabolic syndrome [9]. Effect of differences in life and behavior such as physical inactivity, job stress, work load, altered sleep pattern, more alcoholic consumption etc. in the general population are the major determining factors.

Shafei et al [10] explored 24.3% prevalence of metabolic syndrome in female nurses of North-Eastern Malaysia State. The prevalence in the study group was more than the general population of North West Malaysia state (16.2%) In this study, the factors which were significantly associated with metabolic syndrome were total duration of employment and one way community time to work.

Parale et al[11] did a study to see the prevalence of the metabolic syndrome in Indian Railway employees. They observed that the prevalence of metabolic syndrome in males was 26.77% and in females 27.36%. In this study sedentary job ($p<0.001$) and physical inactivity ($p<0.001$) were most strongly associated with metabolic syndrome which are comparable to our study in which physical inactivity has important causative correlation for metabolic syndrome {($p <0.001$) (coefficient of contingency 0.30263)}. In our study medical professionals with low physical activity prevalence of metabolic syndrome is 63.75%. In cases with moderate and high physical activity the prevalence is 47.56% and 18.65% respectively. Physicians, pediatricians and psychiatrists have more prevalence and non clinical doctors had lesser metabolic syndrome than the other ones. In our study medical professional with mild job stress prevalence of metabolic syndrome is only 23%. In moderate and high job stress the prevalence is 52.22% and 59.50% respectively (p-value <0.001, coefficient of contingency 0.26278). Effect of shift woring on metabolic syndrome in our study is supported by a research carried out in Kashan, a city of Iran [12]. The investigators found 35.9% prevalence of metabolic syndrome in bus and truck drivers who are regularly shift workers. Davila et al also saw high prevalence of metabolic syndrome in shift workers of United States [13]. This observation is supported by Boullu-Ciocca S et al [14] study on the topic of corticotropic axis and chronic stress in abdominal obesity and metabolic syndrome. They found that corticotropic axis hyperactivity may be involved in the development and metabolic and cardiovascular complications of abdominal obesity. In our study medical professionals working for >84 hours/week prevalence of metabolic syndrome is 58.33%. In cases who work for 56-84 hours/week the prevalence is 50.53% and who work for <56 hours, the prevalence is 27.38%. This association was statistically significant (χ^2=19.92, degree of freedom = 2, $p<0.001$). In participants consuming alcohol, prevalence of metabolic syndrome is 57.5% against 37.89% in those not consuming alcohol (χ^2=15.00, df =1, $p<0.001$). In another observation participants sleeping <6 hours/day, prevalence of metabolic syndrome is 55.04% and 29.03% in those who sleep >8 hours/day(χ^2=17.6, df=2, $p< 0.001$). Besides these smoking also plays an important role in the metabolic syndrome but association of smoking is not significant (p- value >0.5).

There were several limitations of our study. The sample size in our study was small. There were not proper criteria to describe the job stress, physical activity, work load and sleep pattern.

In the coming future, a large prospective study is further required to describe the medical occupational benefits versus hazards on individuals' personal and social life. There is emerging need to modify the life style, behavior and personal habits to save the health

of medical professionals. Medical professionals are in sustained exposure to stress or other daily life hampering things; due to this, indirectly, whole of the humanity suffers. The present decreased manpower in medical profession to general population ratio; long term stressful study pattern without any more fruitful or bright future in comparison to other sectors; irrelevant responsibilities offered to a doctor other than to treat the patients etc. may be responsible for this coming epidemic in our medical community .

We, therefore, recommend to detect risk factors for metabolic syndrome and other cardiovascular diseases among medical professionals in India and it should be included as part of a routine medical review.

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