

Prevalence of metabolic syndrome in patients attending general practice outpatient department at a community hospital

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Abstract

Background: Metabolic syndrome, a cluster of metabolic abnormalities which bears increased risk for cardiovascular diseases and diabetes mellitus, requires early screening, diagnosis, and timely intervention. Prevalence varies with age, gender, degree of obesity, and increased propensity for type 2 diabetes mellitus.

Objectives: To find out the prevalence of metabolic syndrome among individuals with hypertension and/or diabetes seeking medical evaluation in general practice outpatient department of Kathmandu Medical College Community Hospital.

Methods: This cross-sectional analytical study was conducted among 100 participants collected by convenience sampling at general practice outpatient department of Kathmandu Medical College Community Hospital, Duwakot, Bhaktapur, Nepal. Physical examination was done and investigations were sent. Metabolic Syndrome was diagnosed using US National Cholesterol Education Program Adult Treatment Panel. Data collection was done from 2019 July to 2019 December. Study population was patients with either hypertension and/or diabetes seeking medical evaluation, age of 18 years or above, both genders, no known comorbidity other than those under medication for hypertension and diabetes. Data analysis was done with SPSS v.16 and two-sample t-test or Chi-square test applied as appropriate. A p-value <0.05 taken as statistically significant.

Results: Out of 100 individuals, 73 were found having metabolic syndrome. It was more common among male (38, 52.1%), obese people of age 40-59 years (42, 57%), and among patients with high body mass index (26.93±2.74).

Conclusion: The prevalence of metabolic syndrome was found significantly high among patients with hypertension or diabetes. Therefore, it is important to diagnose this condition on time to prevent subsequent complications.

Key words: Diabetes mellitus; Hypertension; Metabolic syndrome.

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INTRODUCTION

Metabolic syndrome (MS), syndrome X/insulin resistance syndrome a cluster of metabolic abnormalities, is on increasing trend with urbanisation and obesity,¹⁻³ thereby increasing risk of cardiovascular disease (CVD) and diabetes mellitus (DM).⁴ As per World Health Organisation criteria, a person must have either glucose intolerance or insulin resistance along with two of following four criteria: central obesity, hypertension, dyslipidaemia, and albuminuria.⁵ United States National Cholesterol Education Program-Adult Treatment Panel-

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III (NCEP-ATP-III) provided definition for MS, which states a person must have at least three of following five abnormalities: abdominal adiposity, hypertension, hypertriglyceridaemia, low high density lipoprotein (HDL) cholesterol, and elevated fasting glucose.⁶

Obesity and insulin resistance are at core in most cases of MS, however further research is required to understand pathophysiology behind the syndrome and gene-environment interactions that increase susceptibility.⁷ Atherogenic dyslipidaemia, glucose intolerance, thrombotic tendency, subclinical inflammation, and endothelial dysfunction are higher in South Asians.⁸ Studies show genetic factor and antipsychotics are also associated with MS.^{9,10} Individuals with MS are prone to polycystic ovarian syndrome, fatty liver, cholesterol gallstones, asthma,¹¹ sleep apnoea,¹² SARS-CoV2, COVID-19,^{13,14} and related comorbidities like proinflammatory and prothrombotic states¹¹⁻¹⁵ The objective of this study was to find out prevalence of MS among individuals with hypertension and/or diabetes.

METHODOLOGY

A hospital-based analytical cross-sectional study was carried out among 100 participants of both genders, age 20 years or above, either with hypertension and/or diabetes seeking medical evaluation in general practice outpatient department (OPD) at Kathmandu Medical College Community Hospital, Duwakot, Bhaktapur, Nepal. Ethical clearance was obtained from the Institutional Review Committee IRC in KMCTH (Ref. 120720191). A detailed history was obtained and physical examination was done. Investigations for fasting sugar and lipid profile were sent and all the details were recorded as per proforma.

Data collection was done from 2019 July to 2019 December. Study population was patients of age 20 years or above, both genders, no known comorbidity other than those under medication for hypertension

and diabetes (exception for these two conditions was made because being under medication for diabetes or hypertension is among the criteria for metabolic syndrome). Sampling method was convenient sampling.

Data analysis was done with SPSS Statistics for Windows, version 16.0 (SPSS Inc., Chicago, Ill., USA) and two-sample t-test or Chi-square test applied as appropriate. A p-value <0.05 was taken as statistically significant.

The criteria laid down by United States (US) National Cholesterol Education Program Adult Treatment Panel (NCEP-ATP III) were used to diagnose a MS. The criteria are: waist circumference ≥ 102 cm or >40 inch (male), ≥ 88 cm or >36 inch (female) and >90 cm in males and >80 cm in females as of International Diabetes Foundation (IDF) South Asian criteria, triglyceride (TG) ≥ 150 mg/dl or on treatment; high density lipoprotein (HDL) cholesterol <40 mg/dl in male and <50 mg/dl in female, blood pressure $\geq 130/85$ mmHg or on treatment and fasting glucose ≥ 100 mg/dl or under medication for diabetes. Out of these, at least three criteria are required for the diagnosis of MS.

RESULTS

Out of total 100 patients, MS was identified in 73 patients. Male comprised 38 and female 35 with male:female ratio of 1.09:1. MS was found to be common among the age group of 40-59 years followed by 20-39 years (Figure 1). Regarding the demographic and anthropometric characteristics of participants, the prevalence of MS was found to be more among the patients with high body mass index (BMI). Likewise, high waist circumference was also found to be associated with MS (Table 1). Among all participants, 83 individuals had low HDL, 75 individuals had impaired fasting glucose and 73 had high waist circumference (Figure 2). Similarly, low HDL was found to be the commonest among the patients with MS comprising 64 (87.7%) followed by impaired sugar level and waist circumference comprising 62 (84.9%) each (Table 2).

Table 1: Anthropometric characteristics of participants

Variables	With MS present (N = 73)	Without MS (N = 27)
Age (years), Mean \pm SD	45.32 \pm 11.77	36.63 \pm 10.05
Gender		
Male (44)	38	6
Female (56)	35	21
High waist circumference	62 (84.9%)	11
BMI (kg/m ²) Mean \pm SD	26.93 \pm 2.74	24.319 \pm 3.69

Table 2: Abnormalities of each component among patients with metabolic syndrome (N = 73)

Components	Metabolic syndrome patients with the abnormality, n (%)
High waist circumference	62 (84.9)
Low HDL cholesterol	64 (87.7)
High triglyceride	52 (71.2)
Impaired fasting blood sugar	62 (84.9)
Raised blood pressure	47 (64.4)

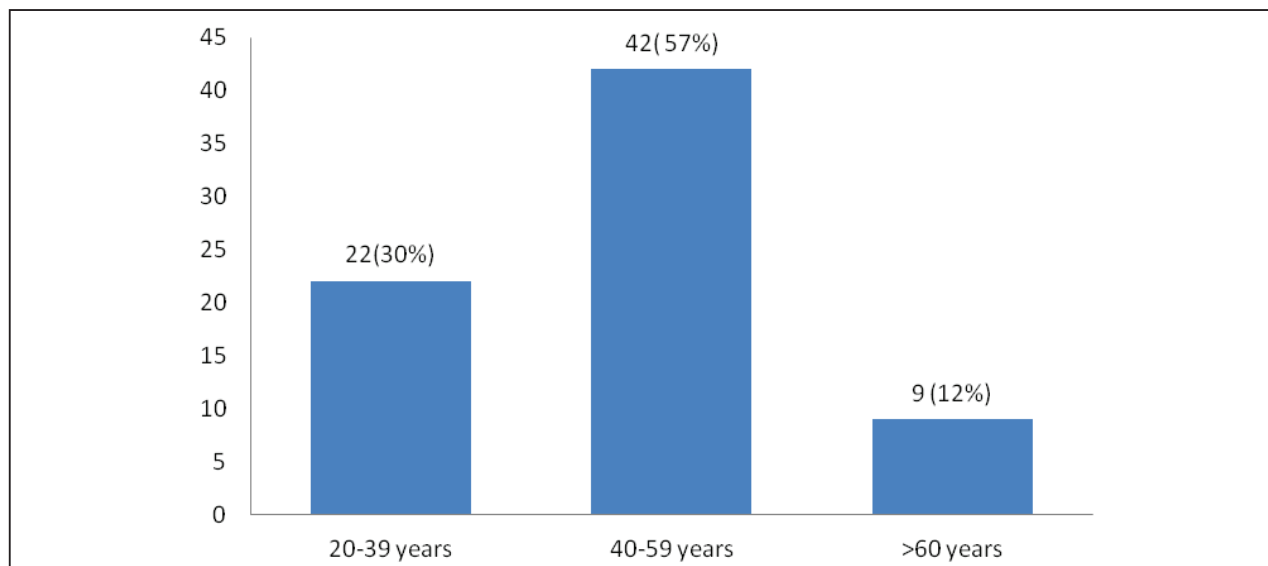


Figure 1: Prevalence of metabolic syndrome according to age groups (N = 73)

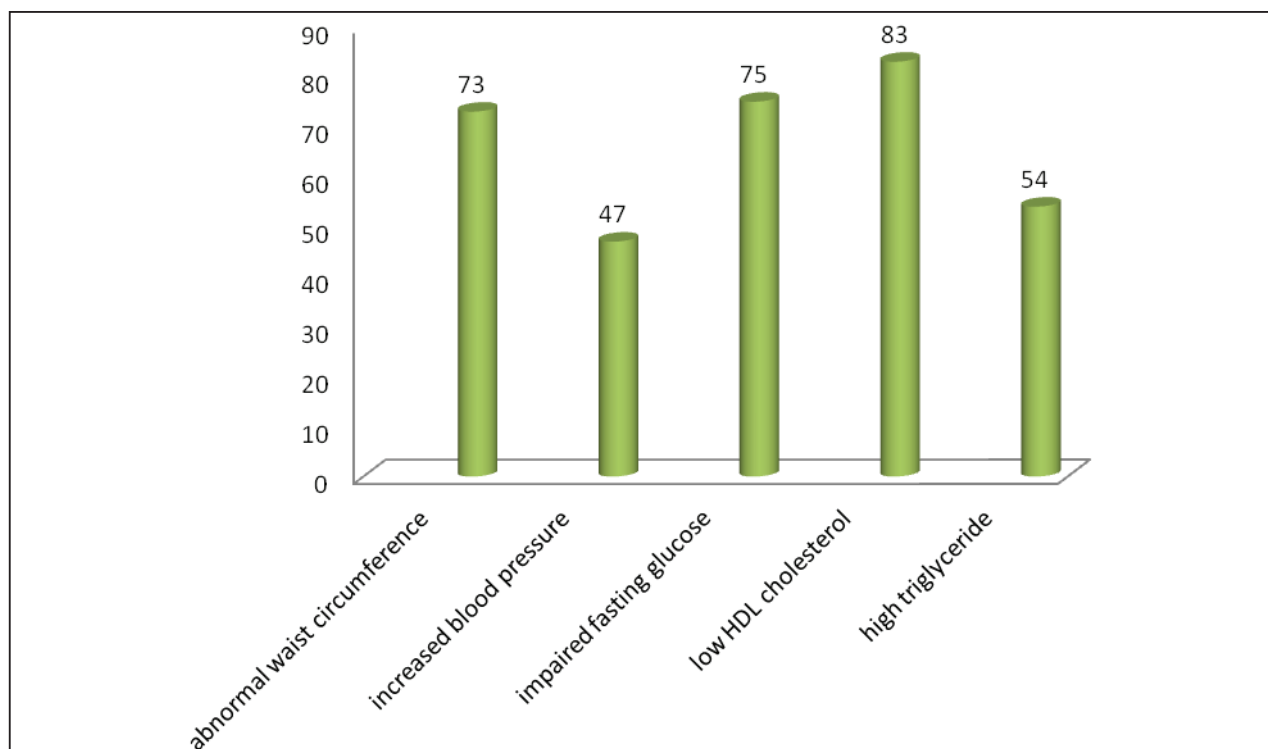


Figure 2: Prevalence of component of metabolic syndrome among total participants according to NCEP-ATP III criteria (N = 100)

DISCUSSION

Metabolic syndrome is increasingly common, and up to one-third of US adults have it. Records have shown 60% of prevalence rate in Native Americans females 45-49 years and 45% in males of 45-49 years.⁴ Prevalence of MS was found to be 20.7% in a study conducted by Sharma et al. in a community-based program of eastern Nepal.¹⁶ Similarly, in study done by Karki et al. prevalence was found to be 14.4% among individuals undergoing comprehensive cardiac and general medical checkup in Kathmandu.¹⁹

The prevalence was found to be quite high comprising 80.3% in a study done by Pokhrel et al. among the population of western developmental region of Nepal with type II DM patients,¹⁷ which is very much compatible with the findings of 73 (73%) in this study. The reason could be due to the selection of the participants either with hypertension or impaired glucose in this study. Another study done by Timalisina et al. showed prevalence of 60% among the diabetic patients attending medicine OPD in Chitwan Medical College Teaching Hospital, Bharatpur, Chitwan, Nepal.¹⁸ Similar study done by Srinivasan et al. in rural Kerala, India found prevalence of 60.9%.²⁰

Prevalence of MS was found to be slightly higher among male in this study with male:female = 1.09:1; however it was found to be more prevalent among female in studies done by Timalisina et al., Karki et al., and Srinivasan et al. comprising 62.5%, 75.7%, and 65.2% respectively.¹⁸⁻²⁰ Metabolic syndrome is most commonly associated with advancing age and obesity. The findings of this study are in concordance with the finding of other studies.¹⁶

The age dependency of the syndrome's prevalence is seen in most populations around the world. Abdominal obesity could be one of the major factors related to MS as seen in abnormalities of individual component of MS and distribution of these components in those with MS.²¹

Waist circumference abnormality was found to be the second most prevalent abnormality comprising 62

(84.9%) participants in this study. The highest prevalent one was low HDL cholesterol (64, 87.7%) and the third most prevalent abnormalities was fasting blood sugar (62, 84.9%).

However, in a study done among type II diabetic patients, increased fasting sugar was found to be the most predominant component,^{17,18} whereas high triglyceride was the most predominant component followed by low HDL cholesterol in a study done by Karki et al.¹⁹ The high prevalence MS among patients with diabetes and hypertension could be due to lack of awareness and unhealthy lifestyle.²² A comprehensive management plan could be assembled through an "ABCDE" approach: "A" for assessment of cardiovascular risk and aspirin therapy, "B" for blood pressure control, "C" for cholesterol management, "D" for diabetes prevention and diet therapy, and "E" for exercise therapy.²³ Monitoring also helps health authorities to prioritise in targeting preventive measures.²⁴

The sample size and single centred study can be considered as limitation of this study.

CONCLUSION

The prevalence of MS was found to be significantly high among the patients with hypertension or diabetes. It was found to be common among the age group of 40-59 years, among the patients with high BMI. Likewise, high waist circumference was also found to be associated with MS. Individuals with low HDL, impaired fasting glucose, and high waist circumference were observed to be more prevalent for MS. Hence it is recommended that the multidisciplinary approach aiming at behaviour modification, healthy dietary habits, physical activity, and pharmacological intervention should be initiated whenever a single component raises an abnormality alarm.

Conflict of interest: None

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