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Prevalence of Metabolic Syndrome among Subjects attending General Health Checkup of a Tertiary Center of Kathmandu, Nepal

Yagya L Shakya, Shankar Raut, Tirtha M Shrestha, Ram P Neupane

Author(s) affiliation

[1]*Department of General Practice and Emergency Medicine, Maharajgunj Medical Campus, Tribhuvan University Teaching Hospital, Institute of Medicine, Kathmandu, Nepal*

Corresponding author

Tirtha M Shrestha, MBBS, MD
tirtha_48@yahoo.com.au

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ABSTRACT

Introduction

Metabolic syndrome is one of the major concerns of modern health causing morbidity and mortality. The metabolic syndrome is the constellation of metabolic disorders - insulin resistance; obesity, dyslipidemia and hypertension that are interrelated which lead to higher risk of cardiovascular disease, diabetes, stroke, atherosclerosis and serious health condition. The study focused on the prevalence of all the metabolic syndrome cases that came to general health checkup (GHC) of Tribhuvan University Teaching Hospital.

Methods

The study was a cross-sectional retrospective study of all cases that came to GHC from July 2019 to October 2019. GHC records files of all patients that came for their general health check-up were used to obtain data that included demographic details and the criteria for metabolic syndrome. Waist circumference, weight, height and blood investigations were sent as a routine examination of the general health checkup. Data analysis was done in Microsoft Excel 2019 and SPSS 20.

Results

Among 311 cases enrolled in our study, 99 (31.8%) met the revised National Cholesterol Education Program, Adult Treatment Panel III (NCEP ATP III) criteria for metabolic syndrome. Among those with metabolic syndrome, males were 52 (52.53%) and females were 47 (47.47%). Also, 81 (81.81%) out of 99 cases had decreased HDL (<1.03 mmol/L for males and <1.30 mmol/L for females), which was the most common component of metabolic syndrome in the study.

Conclusion

Metabolic syndrome is present in almost one third of the studied apparently healthy patients coming for general health checkup and it emphasizes on awareness regarding screening for metabolic syndrome.

Keywords
General health checkup, metabolic syndrome

INTRODUCTION

Metabolic syndrome also known as syndrome X, insulin resistance is the constellation of the disorder, which is, defined by World Health Organization (WHO) as a pathological condition characterized by abdominal obesity, insulin resistance, hypertension and hyperlipidemia. There is rise in the atherogenic lipids-triglycerides, apolipoprotein B, low high density lipoprotein (HDL-C), elevation of blood glucose and blood pressure which increases the risk of prothrombotic and proinflammatory states. It is associated with two-fold rise of cardiovascular disease risk and five-fold risk of diabetes mellitus with 30-40 % high risk of developing diabetes and cardiovascular disease within 20 years depending upon the component of metabolic syndrome.[1] Although regarded as the disease of Western world initially, now it has become a global health concern with rise of metabolic syndrome even in developing countries.[2]

With rise in metabolic syndrome cases in the South Asian population, it is estimated that 20-25% of South Asian have developed the syndrome and many are prone to it.[3,4] Metabolic syndrome is regarded as the first order risk factor for atherosclerotic complications.

The aim of the study was to assess the prevalence of metabolic syndrome as defined by Revised National Cholesterol Education Program, Adult Treatment Panel III (NCEP ATP III) guideline and determine various component of metabolic syndrome.

METHODS

The study was cross sectional retrospective study done at General Health Checkup Clinic of Department of General Practice and Emergency Medicine, TUTH. For our study purpose we used the revised criteria for Asian population defined by NCEP ATP III.

Metabolic syndrome is present where there are three or more of the following:

- Waist circumference ≥ 102cm for males and ≥ 88 cm for females (Revised NCEP ATP III for Asians: ≥ 90 cm for males and ≥ 80 cm for females)
- Systolic blood pressure ≥ 130 mmHg or diastolic blood pressure ≥ 85 mmHg or antihypertensive medication;
- Fasting plasma glucose ≥ 5.6 mmol/L or on medication for high blood glucose;
- HDL cholesterol <1.03 mmol/L for males and <1.30 mmol/L for females;
- Triglycerides ≥ 1.7 mmol/L

All patients that came for general health check up (GHC) were included in the study. People with chronic renal, hepatic, cardiac, gastrointestinal, skeletal, endocrine disease except diabetes, acute illness and pregnancy were excluded in the study. Data was obtained from July 2019 to October 2019.

General health check medical record files of all patients that came for their general health check were used to obtain demographic data that included age, sex, components of metabolic syndrome which included blood pressure, waist circumference, blood sugar, HDL and Triglyceride and BMI. The data analysis was done in Microsoft Excel and SPSS version 20.

Approval to conduct research was obtained from the Institutional Review Committee of Institute of Medicine, Maharajgunj. Permission was also obtained from the Department to access the hospital records of the patient. All records were kept confidential.

RESULTS

The age of the study group varied from 15 years to 84 years with the syndrome more prevalent (38.38%) among the age group of 45-54 years. One subject from age group 15-24 years also had metabolic syndrome in our study. A total of 311 patients that came for general health check up were included in the study out of which 153(49.19%) were male and 158(50.81%) were female. The prevalence of metabolic syndrome in the patients was 99(31.8%) with 47(47.47%) female and 52(52.53%) male according to criteria defined by Revised NCEP ATP III (Table 1).

Similarly, majority of the patients that had metabolic syndrome in our study lived in urban areas with 84 (84.85%) out of 99. In the study, 77(77.78%) out of 99 cases were obese (BMI more than or equal to 25) and a decreasing trend of the syndrome with decrease in BMI (Table 1).

Majority (92.92%) out of 99 patients had their waist circumference ≥90 cm in men ≥80 cm in women (Table 2). Also in the study 81(81.81%) out of 99 cases had HDL <1.03 mmol/L for males and <1.30 mmol/L for females, which were the most common component of metabolic syndrome in the study. Over half (52.53%) out of 99 cases had blood glucose less than 5.6 mmol/l while only 47(47.47%) out of 99 cases had blood glucose more than 5.6mmol/l (Table 2).

DISCUSSION

In our study, the prevalence of metabolic syndrome was in 99(31.83%) out of 311 cases. Nearly one-third of all the apparently healthy population that came for their general health checkup was diagnosed to have metabolic syndrome. In the study of Sharma et al[5], metabolic syndrome was observed in about two-fifths (20.7%) of the patients according to NCEP criteria. These patients are at high risk of having

Table 1. Demographic distribution of metabolic syndrome

Factor	Metabolic syndrome		Total
	No	Yes	
Age group (years)			
15-24	35 (16.50%)	1 (1.01%)	36 (11.58%)
25-34	50 (23.59%)	8 (8.08%)	58 (18.64%)
35-44	55 (25.94%)	24 (24.24%)	79 (25.40%)
45-54	35 (16.50%)	38 (38.38%)	73 (23.48%)
55-64	21 (9.91%)	20 (20.20%)	41 (13.18%)
>65	16 (7.54%)	8 (8.08%)	24 (7.72%)
Gender			
Female	111 (52.36%)	47 (47.47%)	158 (50.81%)
Male	101 (47.64%)	52 (52.53%)	153 (49.19%)
Residence			
Rural	51 (24.06%)	15 (15.15%)	66 (21.23%)
Urban	161 (75.94%)	84 (84.85%)	245 (78.77%)
Marital status			
Married	177 (83.50%)	96 (96.97%)	273 (87.79%)
Unmarried	35 (16.50%)	3 (3.03%)	38 (12.21%)
BMI			
Underweight	25 (11.79%)	0 (0%)	25 (8.03%)
Normal	68 (32.08%)	8 (8.08%)	76 (24.44%)
Overweight	41 (19.34%)	14 (14.14%)	55 (17.69%)
Obese	78 (36.79%)	77 (77.78%)	155 (49.83%)
Total	212 (68.16%)	99 (31.83%)	311 (100%)

Table 2. Components of metabolic syndrome according to NCEP ATP III revised guideline

Factor	Metabolic syndrome		Total
	No	Yes	
Hypertension			
No	201 (94.82 %)	44 (44.44%)	245 (78.77%)
Yes	11 (5.18%)	55 (55.56%)	66 (21.23%)
Fasting Blood Glucose			
Less than 5.6mmol/l	195 (91.98%)	52 (52.53%)	247 (79.43%)
More than 5.6mmol/L	17 (8.02%)	47 (47.47%)	64 (20.57%)
Waist			
<90 for male <80 for female	130 (61.33%)	7 (7.07%)	137 (44.06%)
≥90 cm in men ≥80 cm in women	82 (38.67%)	92 (92.93%)	174 (55.94%)
TG			
TG < 1.7 mmol/L	158 (74.53%)	31 (31.31%)	189 (60.77%)
≥ 1.7 mmol/L	54 (25.47%)	68 (68.69%)	122 (39.23%)
HDL			
Males: ≥1.03 mmol/L / Females: ≥1.30 mmol/L	81 (38.20%)	18 (18.18%)	99 (31.83%)
Males: <1.03 mmol/L / Females: <1.30 mmol/L	131 (61.80%)	81 (81.82%)	212 (68.16%)
Total	212 (68.16%)	99 (31.83%)	311 (100%)

cardiovascular disease or diabetes mellitus in near future if intervention is not done early. There is a rising trend of prevalence of metabolic syndrome in the Asia Pacific population[6] and is also a major health concern for countries like Nepal.

In the study, out of 99 patients, the prevalence of metabolic syndrome among male patients was 52.53% and female was 47.47%. This shows that metabolic syndrome was slightly more common among male than female, which was inconsistent

with the study of Sinha et al[7] and Ramachandran et al.[8] In their study, higher prevalence of metabolic syndrome was shown among female than male. The study also shows that there was no gender predilection.

In this study, it has been found that the BMI, hypertension, fasting blood glucose, waist circumference, TG and HDL were significantly associated with metabolic syndrome. The waist circumference above 90 cm in males and above 80 cm in females was the highest component among the five parameters, which illustrates the trend of increasing BMI and central obesity.[5,9]

HDL value <1.03 mmol/L for males and <1.30 mmol/L for females was the most common laboratory finding in the cases of metabolic syndrome which was similar to the finding by Tamang HK.[9] Impaired or low function of HDL is associated with pro-thrombotic and pro-inflammatory state which increases the risk of myocardial infarction and stroke in patient of metabolic syndrome. People with high normal or normal HDL were less susceptible to developing metabolic syndrome.[10]

Healthy lifestyle habits and lifestyle modification forms important aspect of altering metabolic syndrome.[11,12] The concept of general health checkup helps identify patients with metabolic syndrome among apparently healthy patients and address those risk factors in the form of life style modifications, physical exercises and use of medications before it can lead to cardiovascular disease or diabetes mellitus.

The limitations of the study is that it used the secondary data from the patient's record files and only included the cases that came to general health checkup rather than screening large apparently healthy population. Because of the retrospective design of the study on subjects attending GHC clinic of a tertiary care hospital, the findings may not be generalizable to the whole Nepalese population.

CONCLUSION

Metabolic syndrome was present in almost one third of the apparently healthy subjects coming for general health checkup. Truncal obesity and low HDL cholesterol were the most prevalent components of the metabolic syndrome in the population studied.

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CONFLICT OF INTEREST

None declared.

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