ORIGINAL ARTICLE

The prevalence and the clinical characteristics of metabolic syndrome patients admitted to the cardiac care unit

Ziyad Alakkas [a,*], Khaled A. Alswat [b], Mohammed Al Otaibi [a], Turki Althobaiti [a], Nazih Alzaidi [a], El-Shazly Abdul Khalek [c], Abdulaziz Alfifi [d]

[a] Ta'if University, Ta'if
[b] Division of Endocrinology and Internal Medicine, Ta'if University, Ta'if
[c] Division of Cardiology, King Abdulaziz Specialist Hospital, Ta'if
[d] Division of Internal Medicine, King Abdulaziz Specialist Hospital, Ta'if

[a,b,c,d] Saudi Arabia

Objectives: **Metabolic syndrome (MetS) is a group of multiple cardiovascular risk factors, including dysglycemia, central obesity, high cholesterol, and hypertension. Cardiovascular disease is one of the most common complications of MetS. Recent studies showed that prevalence of MetS among patients admitted with acute coronary syndrome was as high as 46%.**

Design: **We conducted a cross-sectional study of 203 patients at the two main hospitals in Ta'if, Saudi Arabia. Patients older than 18 years who were admitted to the Cardiac Care Unit (CCU) between the months of August 2013 and June 2014 were asked to participate. MetS diagnosis was made based on the International Diabetes Federation definition.**

Results: **A total of 203 patients participated, with 59.1% male and 40.9% were female. The mean age was 60.9 years with a mean body mass index of 28.97 kg/m^2 and a mean waist circumference of 95.45 cm. The prevalence of MetS was 47.8%, primarily among obese female patients who reported sedentary lifestyles. Additionally, MetS patients were more likely to be admitted with heart failure ($p < 0.05$) and more likely to have moderate-to-severe left-ventricular hypertrophy (LVH; $p < 0.05$) relative to non-MetS patients.**

Conclusion: **Of the patients admitted to the CCU, 47.8% had MetS, with those patients likely to be female and obese. Furthermore, MetS patients were more likely to be admitted with heart failure and suffer from moderate-to-severe LVH.**

Keywords: Cardiac Care Unit (CCU), Heart failure, Metabolic syndrome

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* Corresponding author at: Division of Endocrinology and Internal Medicine, Airport Road, Al Huwaya, Ta'if, Saudi Arabia.
E-mail address: alakka.ziyad@gmail.com (Z. Alakkas).

P.O. Box 2925 Riyadh – 11461KSA
Tel: +966 1 2520088 ext 40151
Fax: +966 1 2520718
Email: sha@sha.org.sa
URL: www.sha.org.sa

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Introduction

Metabolic syndrome (MetS) represents a cluster of dangerous cardiovascular risk factors, including central abdominal obesity, high cholesterol, dysglycemia, and high blood pressure [1–3]. The complications of MetS are broad, with cardiovascular complications being the most common, especially coronary artery disease, heart failure, ischemic stroke [4], atrial fibrillation [5], and aortic stenosis [6].

The estimated prevalence of MetS in patients with acute coronary syndrome is high. The Gulf Registry of Acute Coronary Events (Gulf RACE) prospectively enrolled 6071 patients with acute coronary syndrome from 65 centers in six adjacent Middle Eastern gulf countries over a 6-month period. They diagnosed MetS based on guidelines from the International Diabetes Federation (IDF) Task Force on Epidemiology and Prevention, American Heart Association, National Heart, Lung, and Blood Institute, International Atherosclerosis Society, World Heart Federation, and the International Association for the Study of Obesity. There were 3108 (46%) out of the 6701 patients with MetS, and they were more likely to present with a non-ST segment elevation myocardial infarction (NSTEMI; 37% vs. 28%) and unstable angina (UA; 33% vs. 25%) as compared to ST segment elevation myocardial infarction (STEMI; 30% vs. 47%; all $p < 0.001$) [7].

In another study, Agoşton-Coldea et al. [8] performed a cross-sectional study in 256 patients with acute coronary syndrome. The prevalence of MetS was 47.26% as assessed by the criteria of the National Cholesterol Education Program-Adult Treatment Panel III (NCEP-ATP III). The cardiovascular risk has been correlated to MetS (OR 1.29; 95% CI, 1.05–1.54, $p = 0.047$) [8].

MetS is common in patients who are admitted to the CCU, and those people are at risk of developing other cardiovascular complications, such as ischemic heart disease. However, there are few studies that identify the size and impact of the problem in other patients, such as those with heart failure and arrhythmia. The objective of this study was to identify the prevalence and clinical characteristics of MetS in CCU patients in two of the major hospitals in Ta'if, whether presenting with acute coronary syndrome or other cardiac problems, using the new IDF definitions of MetS.

Abbreviations

BMI	body mass index
BP	blood pressure
CCU	Cardiac Care Unit
FBP	fasting plasma glucose
HDL	high-density lipoprotein
HF	heart failure
IDF	International Diabetes Federation
JNC 7	Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure
LDL	low-density lipoprotein
LVEF	left-ventricle ejection fraction
LVH	left-ventricular hypertrophy
MetS	metabolic syndrome
NCEP-ATP III	National Cholesterol Education Program-Adult Treatment Panel III
NSTEMI	non-ST-segment elevation myocardial infarction
RACE	Registry of Acute Coronary Events
STEMI	ST-segment elevation myocardial infarction
TG	triglyceride
UA	unstable angina
WHO	World Health Organization

Materials and methods

A cross-sectional study was conducted at the Division of Endocrinology and Cardiology at King Abdulaziz Specialist Hospital and King Faisal Hospital, Ta'if, Saudi Arabia. A total of 203 patients were admitted to the CCU between August 2013 and July 2014, and those older than 18 years participated in the study. We excluded unconscious patients. Detailed medical history, including presenting illness, past medical history, drug history, family history, special habits, and physical activity, was obtained from participating physicians directly from the patients after obtaining their consent. Anthropometric measurements, including height, weight, body mass index (BMI), waist circumference, and hip circumference, were measured.

The World Health Organization (WHO) recommendations on physical activity for health [9] were considered, which recommends adult do at least: 150 min of moderate-intensity physical activity or 75 min of vigorous-intensity physical activity or an equivalent combination of moderate- and vigorous-intensity activity.

Physical activity among patients was categorized according to these recommendations into healthy physical activity (for those who meet the recommendations), non-healthy physical activity (for those who did not meet the recommenda-