Prevalence of metabolic syndrome among patients with coronary artery disease in Basrah, Iraq

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ABSTRACT

Background & Methods: Metabolic Syndrome (MetS) is a group of comorbidities including visceral obesity, dyslipidemia, hypertension, and impaired glycemic tolerance or diabetes. MetS has been associated with a considerable risk of coronary artery disease (CAD) and type 2 diabetes. We conducted this study to determine the frequency of MetS among patients with CAD in Basrah, Iraq.

Methodology: This study was conducted in Basrah Oil Specialized Hospital for Cardiovascular Medicine and Surgery, in Basrah, and included 150 patients with CAD, diagnosed by coronary angiography. Out of 150, 93 (62%) patients were males and 57 (38%) were females. We also included 150 apparently healthy individuals as controls; 93 (62%) males and 57 (38%) females. The age of both patients and controls were 40-80 y. Wight, height, waist circumference (WC), and blood pressure (BP) were measured. Biochemical parameters including fasting plasma glucose (FPG), high-density lipoprotein-cholesterol (HDL-C), and triglyceride (TG) were also measured.

Results: The frequency of MetS was significantly higher among patients with coronary artery disease than in controls (P < 0.01). Also, it is more frequent among females (88%) compared to males (73%).

Conclusion: The frequency of metabolic syndrome among patients with coronary artery disease is significantly higher compared to healthy population without heart disease.

Abbreviations: CAD - Coronary artery disease; FPG - Fasting plasma glucose; HDL-C - High-density lipoprotein-cholesterol; MetS - Metabolic Syndrome; TG - Triglyceride

Keywords: Coronary Artery Disease; Metabolic Syndrome; Insulin Resistance.


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1. INTRODUCTION

CAD is a complex event in which there is a poor supply of blood and oxygen to the heart muscle. CAD disease is considered the primary source of morbidity and mortality worldwide.1

Metabolic syndrome (MetS) is a group of medical comorbidities that occur together, which increases the likelihood of developing stroke, heart disease, and type 2 diabetes mellitus (T2DM).2 It is linked with a higher risk of CAD.3 MetS and its components can be influenced by variable factors, age, genetics, gender, diet, lifestyle, levels of physical exercise, diabetes, hypertension, and others.4,5

The criteria used for the diagnosis of MetS are diverse, including WHO criterion,6 European Group for the Study of Insulin Resistance (EGIR) in 1999,7

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The purpose of this study was to determine the frequency of MetS and its components among patients with CAD, in Basra, Iraq.

2. METHODOLOGY

This case-control study proceeded in Basra Oil Specialized Hospital for Cardiovascular Medicine and Surgery, in Basra governorate, Southern Iraq, from December 2022 to April 2023.

We enrolled 300 participants in this study, out of which 150 were patients (93 males, 57 females) scheduled for percutaneous coronary intervention (PCI), and 150 participants (93 males, 57 females) were apparently healthy as a control, matched for age and gender with patients. All subjects in the study underwent body weight, height measurements; waist circumference, BMI, and BP were measured, BP was taken twice after at least 10 min between two measurements. Blood samples were collected for all subjects, fasting plasma glucose (FPG) levels were determined and reference enzymatic methods carried out.

Patients were diagnosed with MetS according to the updated ATP III criteria, the diagnosis of MetS require the presence of three or more of the following: WC ≥ 88 cm for women and ≥ 102 cm for men, low HDL-C (< 40 mg/dL in men, < 50 mg/dL in women), elevated triglyceride (TG) (≥ 150 mg/dL), hypertension (BP more than 130/85 mmHg), and IFG (≥ 100 mg/dL). A great connection has been found between MetS and CAD events, several studies showed a correlation between MetS and carotid atherosclerosis.

The statistical package for social sciences (IBM SPSS) software version 25.0, IBM Corp., Chicago, USA, 2021, was used to analyze the data of this study. P < 0.05 was considered to be significant.

3. RESULTS

The characteristics of the study groups, including age, SBP, DBP, WC, and BMI are listed in Table 1. Which reveal no significant differences between patients with CAD (whether they were males or females) and controls in term of age (P > 0.05). On the other hand, SBP, DBP, WC, and BMI were significantly higher among patients

Table 1: Characteristics of the study groups.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Males</th>
<th></th>
<th>Females</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patients</td>
<td>Controls</td>
<td>P-value*</td>
<td>Patients</td>
<td>Controls</td>
<td>P-value#</td>
</tr>
<tr>
<td></td>
<td>(n = 93)</td>
<td>(n = 93)</td>
<td></td>
<td>(n = 57)</td>
<td>(n = 57)</td>
<td></td>
</tr>
<tr>
<td>Age (y)</td>
<td>56.4 ± 8.5</td>
<td>57.9 ± 12</td>
<td>P &gt; 0.05</td>
<td>58.4 ± 13.9</td>
<td>55.6 ± 9</td>
<td>P &gt; 0.05</td>
</tr>
<tr>
<td>SBP (mmHg)</td>
<td>139.2 ± 22.0</td>
<td>120.0 ± 14.6</td>
<td>P &lt; 0.01</td>
<td>138.0 ± 25.5</td>
<td>113.2 ± 15.7</td>
<td>P &lt; 0.01</td>
</tr>
<tr>
<td>DBP (mmHg)</td>
<td>86.3 ± 14.0</td>
<td>76.5 ± 6.2</td>
<td>P &lt; 0.01</td>
<td>86.5 ± 12.0</td>
<td>74.8 ± 5.8</td>
<td>P &lt; 0.01</td>
</tr>
<tr>
<td>WC (cm)</td>
<td>103.0 ± 13.0</td>
<td>76.5 ± 6.2</td>
<td>P &lt; 0.01</td>
<td>97.9 ± 15.84</td>
<td>81.4 ± 6.3</td>
<td>P &lt; 0.01</td>
</tr>
<tr>
<td>BMI (kg/m2)</td>
<td>26.4 ± 4.9</td>
<td>21.0 ± 3.6</td>
<td>P &lt; 0.01</td>
<td>28.7 ± 4.7</td>
<td>23.2 ± 3.3</td>
<td>P &lt; 0.01</td>
</tr>
</tbody>
</table>

* P-value (male patients vs. male controls), # P-value (female patients vs. female controls), @ P-value (overall patients vs. overall controls).

Table 2: Frequency of metabolic syndrome

<table>
<thead>
<tr>
<th>MetS Presence</th>
<th>Males</th>
<th></th>
<th>Females</th>
<th></th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patients</td>
<td>Controls</td>
<td>P - value*</td>
<td>Patients</td>
<td>Controls</td>
</tr>
<tr>
<td>Present</td>
<td>68 (73)</td>
<td>17 (18)</td>
<td>&lt; 0.01</td>
<td>50 (88)</td>
<td>10 (17.5)</td>
</tr>
<tr>
<td>Absent</td>
<td>25 (27)</td>
<td>76 (82)</td>
<td></td>
<td>47 (82.5)</td>
<td>57 (100)</td>
</tr>
<tr>
<td>Total</td>
<td>93 (100)</td>
<td>93 (100)</td>
<td></td>
<td>57 (100)</td>
<td>57 (100)</td>
</tr>
</tbody>
</table>
The incidence of MetS among overall patients (78.7%) was significantly higher among females than males, whether males or females. Another study found that changes in MetS and its components were connected with a variety of risks for CVD events in both genders, with generally prominent association in women than men.22

5. CONCLUSION

In conclusion, the frequency of metabolic syndrome is significantly higher among patients with coronary artery disease (whether males or females) in comparison to controls. This indicates that patients with metabolic syndrome are at considerable risk of cerebrovascular events.

6. Data availability

The datasets produced and/or analyzed during the current study are available from the corresponding author on a reasonable request.

7. Ethical issues

This study was approved by the institutional research ethics committee of the Department of Biochemistry, College of Medicine, University of Basrah, Basrah, Iraq. Written informed consent was obtained from all patients.

8. Conflict of interest

The study utilized the hospital resources only, and no external or industry funding was involved.

9. Authors’ contribution

MAH: Drafting the manuscript
SKA, MAHZ: Conduction of the study work, manuscript editing

Table 3. Frequency of Metabolic Syndrome components

<table>
<thead>
<tr>
<th>MetS Component</th>
<th>Males Patients</th>
<th>Males Controls</th>
<th>P *</th>
<th>Females Patients</th>
<th>Females Controls</th>
<th>P #</th>
<th>Overall Patients</th>
<th>Overall Controls</th>
<th>P @</th>
</tr>
</thead>
<tbody>
<tr>
<td>WC (cm)</td>
<td>39 (42)</td>
<td>21 (22.5)</td>
<td>&lt; 0.01</td>
<td>41 (72)</td>
<td>10 (17.5)</td>
<td>&lt; 0.01</td>
<td>80 (53)</td>
<td>31 (21)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>FPG (mg/dL)</td>
<td>49 (53)</td>
<td>0.0 (0.0)</td>
<td>&lt; 0.01</td>
<td>38 (66.6)</td>
<td>0.0 (0.0)</td>
<td>&lt; 0.01</td>
<td>87 (58)</td>
<td>0.0 (0.0)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>BP (mg/dL)</td>
<td>69 (74)</td>
<td>17 (18)</td>
<td>&lt; 0.01</td>
<td>43 (75)</td>
<td>10 (17.5)</td>
<td>&lt; 0.01</td>
<td>112 (75)</td>
<td>27 (18)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>HDL-C (mg/dL)</td>
<td>75 (80.6)</td>
<td>28 (30)</td>
<td>&lt; 0.01</td>
<td>43 (75)</td>
<td>34 (60)</td>
<td>&lt; 0.01</td>
<td>118 (79)</td>
<td>62 (41)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>TG (mg/dL)</td>
<td>75 (80.6)</td>
<td>17 (18)</td>
<td>&lt; 0.01</td>
<td>48 (82)</td>
<td>2 (3.5)</td>
<td>&lt; 0.01</td>
<td>123 (82)</td>
<td>19 (13)</td>
<td>&lt; 0.01</td>
</tr>
</tbody>
</table>

WC: Waist circumference, FPG: Fasting plasma glucose, BP: Blood pressure, HDL-C: High density lipoprotein-Cholesterol, TG: Triglycerides, * P - male patients vs. male controls
# P - female patients vs. female controls; @ P - overall patients vs. overall controls.
MMMA: Evaluation and sending the manuscript

10. REFERENCES


