Open Access Research Article

Prevalence and Demographic Characteristics of the Metabolic Syndrome in a Group of Iraqi Patients with Acute Coronary Syndrome

DOI: https://doi.org/10.32007/jfacmedbagdad.6511951.

Zina S. Abdulrahman Aldaggistany* **FIBFM**
Ihab S. Ahmed** **FIBMS(Medicine), FIBMS (GE & H)**
Zuhair A. Al-Johar*** **FIBMS(Neurology)**

Abstract:

Background: The demographic characteristics of Iraqi patients with the metabolic syndrome (MS) and presenting with acute coronary syndrome (ACS) has been scarcely studied before.

Aim of the study To study the socio-demographic characteristics of a group of Iraqi patients with MS presenting with ACS.

Patients and Methods: A convenience sample of 150 cases presenting with ACS and admitted to the coronary care unit (CCU) of Al-Yarmouk Teaching Hospital in Baghdad from mid-January through July 2011 were included in the current cross-sectional study. The data needed for the study was collected through a direct interview to fill a questionnaire by all cases carried out by a consultant physician.

Results: Of all the 150 ACS cases included in the study, 69.3% had MS. The prevalence of MS among males was 63.8%, and among females was 78.6%. The most frequently seen age group was 50-59 years. Gender differences in MS patients were statistically significant regarding: Residence (Urban: 63.3% M, 84.1% F), educational level (illiteracy: 15% M, 52.3% F, high education: 25% M, 4.5% F), and employment (Employed: 50% M, 22.7% F). Males with MS and ACS had more myocardial infarction (MI) (80%) than unstable angina, compared to females (41% MI), with statistically significant associations.

Conclusion: The prevalence of MS in Iraqi ACS cases is high, and among them MI was significantly higher in Males.

Keywords: Metabolic syndrome, Coronary, Demographics, Gender

J Fac Med Baghdad
2023; Vol.65, No. 1
Received: July, 2022
Accepted: April, 2023
Published: April 2023

Introduction:

The metabolic syndrome (MS) is "a cluster of the most dangerous heart attack risk factors: Glucose metabolism disorder, abdominal obesity, dyslipidemia and high blood pressure" (1).

The formal WHO definition of MS is: "a person must have either glucose intolerance or insulin resistance along with two of the following four criteria: central obesity, hypertension, dyslipidemia, and albuminuria" (2).

Of the adult population in the world, it is estimated that nearly 20-25% have MS and they have double chance of dying from and triple chance of having a stroke or heart attack compared to people not having MS (3). The risk of developing type 2 diabetes is fivefold greater in people with MS (4). There are already around 463 million adult cases of diabetes in the world (5). The grouping of cardiovascular disease (CVD) risk factors characteristic of MS is now viewed as the impetus for a new epidemic of CVD (6).

Revised criteria for MS were presented by the International Diabetes Federation (IDF) in 2005 stating that: "central obesity is considered an essential element in this definition, with different waist circumference (WC) thresholds set for different race/ethnicity group" (7).

As the number of obese people increases, more people would have MS and insulin resistance (8). Patients with MS and insulin resistance are at higher risk for developing ACS, have more chance of developing it younger in life, and coronary events in them have worser prognosis (9). Early insulin resistance and obesity have been shown to be strongly linked to atherosclerosis in youth (10). An independent association between dysfunction of coronary endothelium and obesity was found in patients with normal or mildly diseased coronary arteries (11) and obesity-related insulin-resistant syndromes have been shown to have a dysfunctional coronary circulation (10).

Aims of the study: To explore the prevalence of MS among patients with ACS, their socio-demographic characteristics and the association

* *Al Jihad Health Center for Family Medicine \ Baghdad Health Directorate - Al-Karkh \MOH drzina1981@gmail.com*
** *Specialist physician, Baghdad teaching hospital, Medical City\MOHehabalnuaimi@yahoo.com*
*** *Corresponding Author: Dept. of Medicine\College of Medicine \ University of Baghdad zaljohar@comed.uobaghdad.edu.iq*

between the above conditions and these characteristics

Patients and Methods:

The current cross-sectional study was conducted during the period (from mid-January through July 2011). All patients presenting with Acute Coronary Syndrome (ACS) and admitted to the Coronary Care Unit (CCU) in Al-Yarmouk Teaching Hospital during that period were included in the study, with no exclusion criteria. The data was collected through a direct interview with the patients using a detailed questionnaire form. The patients' relatives and treating physician also provided some of the information. At the initiation of the interview, the researcher explained the purpose of the study to the patient. Verbal consent was taken with the reassurance that the information collected will be kept confidential and will not be used except the research objective. Complete history and physical examination were performed by the researcher supervised by the treating physician. Revision of the patients' clinical records was done to reach the final diagnosis. The questionnaire included the following information:

I. Demographic data**:** Age (in years), Sex, Residence, Marital status, educational level and Employment status.

II. Information on ACS: Presentation (chest pain, dyspnoea, sweating, nausea, vomiting), Duration of chest pain till reaching the hospital, and Preceding chest discomfort.

III. Investigations: Routine CCU-ordered investigations for all patients admitted with ACS: Enzymes levels: Creatine Kinase CK-MB, troponin I. (TnI), Lipid profile (Triglycerides (TG), Cholesterol, and High-Density Lipoprotein (HDL)), and Fasting Blood Sugar (FBS).

ACS includes unstable angina (UA) and myocardial infarction (MI) (12). The diagnosis of MI was based on the following: "detection of a rise and /or fall of cardiac biomarkers (preferably troponin) with at least one of the following: Ischemic symptoms, development of pathologic Q waves on the ECG, ECG changes indicative of ischemia (ST segment elevation or depression)" (13).

UA was diagnosed by: "new onset or rapidly worsening angina (crescendo angina), angina on minimal exertion or angina at rest in the absence of myocardial damage (negative troponin test)" (12).

MS was diagnosed according to the criteria of the IDF 2005 including "Central obesity as an essential element, with different waist circumference thresholds set for different race/ethnicity groups (Male ≥94 cm and Female ≥ 80 cm.), plus any two of the following four factors: 1. Raised triglyceride ≥150 mg/dl (1.7mmol/l) or drug treatment for high triglyceride; 2. Reduced HDL cholesterol <40 mg/dl (1.03 mmol/l) in males ,<50 mg/dl (1.29 mmol/l) in females or drug treatment for low HDL; 3. Raised blood pressure: Systolic BP≥ 130 mmHg or Diastolic BP≥ 85 mmHg or treatment of previously diagnosed hypertension; 4. Raised fasting plasma glucose ≥ 100 mg/dl (5.6mmol/l) or previously diagnosed type II diabetes" (7).

Statistical Analysis: For data entry and analysis, SPSS version 18 was used. Data description included numbers and percentages for discrete variables, and mean ± standard deviation (SD) for continuous variables. Significance was tested using Chi-square and Fisher's exact tests for associations between variables and by the two (independent)-sample Student's t-test for the differences between means, at $p \leq 0.05$.

Results:

The total number of patients was 150. The mean age of cases with MS was 56.5±12.6. Table (1) shows that (27.3%) of the cases were between 50-59 years of age group; there were more males (62.7%) than females, with a male to female ratio of 1.7:1; mostly from urban areas (73.3%); (52%) had primary school education or less; (62.7%) were unemployed; and (81.3%) were married.

Table (1): Distribution of the study sample by socio-demographic characteristics.

Variables	Categories	N	%
Age groups (years)	<40	15	10
	40-49	32	21.3
	50-59	41	27.3
	60-69	34	22.7
	70+	28	18.7
Gender	Female	56	37.3
	Male	94	62.7
Residence	Rural	40	26.7
	Urban	110	73.3
Educational level	Illiterate	44	29.3
	Primary level	34	22.7
	Intermediate school	27	18
	Secondary school	22	14.7
	Higher education	23	15.3
Employment status	Unemployed	94	62.7
	Employed	56	37.3
Marital status	Single	8	5.3
	Married	122	81.3
	Divorced	4	2.7
	Widow	16	10.7
Total		150	100

Figure (1) shows that out of the 150 patients (69.3%) fulfilled the criteria of MS, of whom 60 were males and 44 were females. The prevalence of MS among males was 63.8%, and among females was 78.6%, but not statistically significant (P> 0.05).

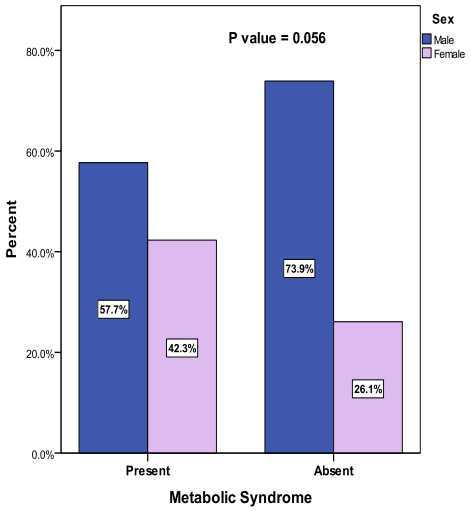

Figure (1): Distribution of study group by gender and the presence of metabolic syndrome

Table (2) shows the distribution of demographic characteristics by gender in MS patients, and reveals a significant association between gender and residence (more males from rural areas), educational level (more males with higher education and more illiterate females) and employment (with higher employment among males)

Table (2): Demographic Characteristics of patients with metabolic syndrome by gender.

Variables	Categories	Male		Female		Total		P
		N	%	N	%	N	%	
Age Group (years)	< 40	7	11.7	3	6.8	10	9.6	0.575
	40-49	11	18.3	9	20.5	20	19.2	
	50-59	18	30.0	14	31.8	32	30.8	
	60-69	12	20.0	12	27.3	24	23.1	
	≥ 70	12	20.0	6	13.6	18	17.3	
Residence	Rural	22	36.7	7	15.9	29	27.9	0.020
	Urban	38	63.3	37	84.1	75	72.1	
Marital Status	Single	3	5.0	2	4.5	5	4.8	0.113
	Married	52	86.7	32	72.7	84	80.8	
	Divorced	0	0.0	3	6.8	3	2.9	
	Widow	5	8.3	7	15.9	12	11.5	
Educational Level	Illiterate	9	15.0	23	52.3	32	30.8	0.000
	Primary	14	23.3	6	13.6	20	19.2	
	Intermediate	12	20.0	5	11.4	17	16.3	
	Secondary	10	16.7	8	18.2	18	17.3	
	Higher Education	15	25.0	2	4.5	17	16.3	
Employment	Employed	30	50.0	10	22.7	64	61.5	0.005
	Unemployed	30	50.0	34	77.3	40	38.5	
Total (100%)		60		44		104		

Table (3) shows the association of demographic variables with the presence or absence of MS. None of these associations were statistically significant.

Table (3): Demographic of patients with and without metabolic Characteristics syndrome.

Variables	Categories	MS +ve		MS –ve		Total		MS+ve	P
		N=104	%	N=46	%	N=150	%	% from Total	
Age Group (years)	< 40	10	9.6	5	10.9	15	10	67	0.63
	40-49	20	19.2	12	26.1	32	21.3	63	
	50-59	32	30.8	9	19.6	41	27.3	78	
	60-69	24	23.1	10	21.7	34	22.7	71	
	≥ 70	18	17.3	10	21.7	28	18.7	64	
Residence	Rural	29	27.9	11	23.9	40	26.7	73	0.61
	Urban	75	72.1	35	76.1	110	73.3	68	
Marital Status	Single	5	4.8	3	6.5	8	5.3	63	0.92
	Married	84	80.8	38	82.6	122	81.3	69	
	Divorced	3	2.9	1	2.2	4	2.7	75	
	Widow	12	11.5	4	8.7	16	10.7	75	
Education Level	Illiterate	32	30.8	12	26	44	29.3	73	0.36
	Primary	20	19.2	14	30.5	34	22.7	59	
	Intermediate	17	16.3	10	21.7	27	18	63	
	Secondary	18	17.3	4	8.8	22	14.7	82	
	Higher Education	17	16.3	6	13	23	15.3	74	
Employment	Employed	64	61.5	30	65.2	94	62.7	68	0.67
	Not Employed	40	38.5	16	34.8	56	37.3	71	

Table (4) shows the distribution of MS cases by type of presentation and gender: of the 150 cases with ACS, those who presented as MI were (63.5%) with a male to female ratio of 2.7:1, while those who presented with unstable angina constituted (36.5%) with a male to female ratio of 0.46:1; which was statistically significant (P<0.001).

Table (4): Association between presentation of acute coronary syndrome and Metabolic syndrome.

Presentation of the patients	Males		Females		Total		P
	N	%	N	%	N	%	
MI	48	80.0	18	40.9	66	63.5	<0.001
Unstable Angina	12	20.0	26	59.1	38	36.5	
Total	60	100	44	100	104	100	

Table (5) show the distribution of ACS cases by type of presentation and the presence or absence of MS. The distribution did not show a statistically significant association.

Table (5): Distribution of the ACS group by type of presentation and the presence or absence of MS

Presentation of the patients	MS +ve		MS –ve		Total		P
	N	%	N	%	N	%	
MI	66	63.5	34	73.9	100	66.7	0.211
Unstable Angina	38	36.5	12	26.1	50	33.3	
Total	104	100	46	100	150	100	

Discussion:

Worldwide, MS is a major health problem associated with increased morbidity and mortality. Of the world population, MS is detected in 20–40%, and it is found in 30–65% of patients with ischemic heart diseases (IHD) (1).

The present study reported the proportion of MS according to the new IDF criteria among patients with ACS. It was postulated that the IDF definition of MS may be more accurate than the NCEP-ATP III definition in identifying individuals with very high cardiovascular risk (14). The IDF definition of MS is oriented to the cardio-metabolic risks, and so it is expected to have more discriminative value in identifying future coronary heart disease (CHD) events than the current definitions, since it emphasizes the waist circumference as an established index of abdominal obesity (14,15,16), thereby providing information about the conventional risk factors (17,18), as well as about cardio-metabolic risk profile among individuals (19-20). The association between IHD and MS is reflected by the fact that people with ACS have higher prevalence of MS than in the general population. It has recently been confirmed that: "MS is an independent predictor of ACS in patients in secondary prevention" (21). The current study found a high prevalence of MS (69.3%) in patients with ACS, this finding is supported by previous reports indicating a higher prevalence of MS observed with the use of IDF criteria compared with other definitions. Solymoss (22). Showed that MS was present in 51% of patients having symptoms of coronary artery disease, while other studies reported 29% and 46% prevalence of MS in patients with ACS depending on the definition of MS used (23, 24). The prevalence of MS in ACS was 66% in a study conducted in Oman (25), while in six Middle Eastern Countries the prevalence of MS in patients with ACS was 46% (26).

In the current study MS was insignificantly more common in women than in men (78.6% vs 63.8%), which contradicts the results of many other studies (27, 28), like a 10-year study from Italy which found MS in 34.6% of men and 21.2% of women (29) and a Spanish study which found the prevalence of MS to be much higher in men than in women (30, 31). However, other researchers reported MS to be more common in women than in men (32, 33).

The mean age of cases with MS was 56.5±12.6, which corresponds to the observations of Zeller et al (34). The age group of (50-59 years) had the highest prevalence of MS, which is in agreement with the study of Ford (35) which found that the overall prevalence of MS was 22% with age-related increments (6.7, 43.5, 42.0% for age groups 20-29, 60-69, and 70+ years respectively).

The mean age of non-MS in this study was consistent with Al-Rasadi study (25), and Al Suwaidi study (26).

There was higher prevalence of cases living in urban areas in both MS and non-MS patients. Living in urban areas was higher in females with MS than in males, and the difference was statistically significant. Same conclusion was reached by Ford (34), and may be attributed to life style difference between urban and rural residence.

The high percentage of married people in MS as well as non-MS groups was similar to results reached by Al-Owaish (36) and Assel (37).

The gender differences in educational level agreed with results reached by Assel (37), this might be attributed to the life style factors.

The higher percentage of unemployment in MS patients of our study was inconsistent with other studies which considered that employment might have more stress, more responsibility and lighter physical activity, leading to higher proportion of having MS (38).

Conclusions:

The prevalence of MS in Iraqi ACS cases is high, and among them MI was significantly higher in Males. MS was higher with unemployment, especially unemployed, illiterate, females living in urban areas.

Authors' declaration: -
Conflicts of Interest: None. -
We hereby confirm that all the Figures and Tables in the manuscript are ours.
Ethical consideration's approval-Ethical Clearance: -
The project was approved by the local ethical committee in The Iraqi Board for Medical Specializations according to the code number (78/b) in 11/1/2011

Author contributions:
Zina S. Aldaggistany: study conception, study design, data collection, data analysis and interpretation.
Ihab S. Ahmed: study conception, study design, data collection and interpretation.
Zuhair A. Al-Johar: study conception, data analysis and interpretation, drafting of the manuscript, critical revision.

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How to Cite this Article:

S. Abdulrahman Aldaggistany Z, S. Ahmed I, Al-Johar Z. Prevalence and Demographic characteristics of Metabolic Syndrome in Iraqi Patients with Acute Coronary Syndrome. JFacMedBagdad [Internet]. 2023 Apr. 27 [cited 2023 May 8];65(1):7-13. Available from: https://iqjmc.uobaghdad.edu.iq/index.php/19JFacMedBaghdad36/article/view/1951

انتشار المتلازمة الأيضية والخصائص السكانية لها عند المرضى العراقيين المصابين بحالة المتلازمة التاجية الحادة

الدكتورة الاختصاصية: زينة سعد عبد الرحمن الداغستاني مركز الجهاد الصحي لصحة الاسره /دائرة صحة بغداد-الكرخ
الدكتور الاختصاصي:ايهاب سعيد احمد مدينة الطب/مستشفى بغداد التعليمي
الاستاذ المساعد الدكتور: زهير عبد الغفور الجوهر كلية الطب/جامعة بغداد

الخلاصة
خلفية البحث: المتلازمة الأيضية عند المرضى العراقيين المصابين بالمتلازمة التاجية الحادة قليلا ما تمت دراستها.
الأهداف: دراسة الخصائص المجتمعية-السكانية للمرضى العراقيين المصابين بالمتلازمة الايضية مع المتلازمة التاجية الحادة.
المرضى وطرق العمل: شملت الدراسة المقطعية 150 مصابا بالمتلازمة التاجية الحادة الذين يعالجون في وحده العناية القلبية في مستشفى اليرموك التعليمي في بغداد للفترة من منتصف كانون الثاني إلى شهر تموز، عام 2011) تم جمع المعلومات باستخدام إستمارة صممت لهذا الغرض تملأ من خلال مقابلة المرضى بأنفسهم أو أقاربهم. واعتمد تشخيص الطبيب الاستشاري المعالج في تصنيف الحالات.
النتائج: بلغت نسبة المتلازمة الأيضية بين مرضى المتلازمة التاجية الحادة 69.3%، 63.8% بين الذكور و 78.6% بين الإناث إلا أن الفرق بدون دلالة إحصائية. وكانت أعلى نسبة بين الفئة العمرية (50-59 سنة). كانت الفروقات مابين الجنسين عند المصابين بالمتلازمة الايضية ذات دلالة إحصائية بخصوص مكان السكن (حضري: 63.3% ذكور، 84.1% أناث)، المستوى التعليمي (الأمية: 15% ذكور، 52.3% أناث، التعليم العالي: 25% ذكور، 4.5% أناث)، وطبيعة العمل (موظف: 50% ذكور، 22.7% أناث). كانت إصابة الذكور المصابين بالمتلازمة الأيضية مع المتلازمة التاجية الحادة بالجلطة القلبية (80%) أكثر من الذبحة الصدرية غير المستقرة، وكان العكس عند الاناث (41% جلطة قلبية) وكان الفرق ذا دلالة إحصائية.
الإستنتاجات: هناك مستوى إنتشار مرتفع للمتلازمة الأيضية عند العراقيين المصابين بالمتلازمة التاجية الحادة ومن بين هؤلاء كانت الإصابة بالجلطة القلبية أكثر عند الذكور بفرق ذو دلالة احصائية.
مفتاح الكلمات: متلازمة أيضية، تاجية، سكانية، الفروقات حسب الجنس