

The Prevalence of Acute Myocardial Infarction (AMI) in Taif City Province and its Participating Factors

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ABSTRACT

Background: Myocardial infarction (MI) is a fatal disease caused by block in the oxygen supply of blood vessels of the heart muscles, leading to permanent heart muscle damage and death of its cells. **Aim of work:** to assess the relationship between incidence of acute myocardial infarction and its participating factors.

Patients and methods: observational, descriptive correlation questionnaire based study on 50 Saudi and non Saudi patients with acute myocardial infarction who were admitted in cardiac intensive care unit (CICU), medical ward and followed in out-patient department (OPD). They were chosen from King Faisal Medical Center, cardiology department, Taif, Saudi Arabia from the first of March 2016 to the end of April 2016 (2 months duration). **Results:** Prevalence of MI patients in the 2 months of research was 1.4%. MI was precipitated by a number of factors in Saudi Arabia as old age, increased body mass index, stress, obesity and consumption of high caloric rich diet. **Conclusion:** The main risk factors of ACS in our patients were hypertension, Stress, obesity; high cholesterol diet and positive family history of cholesterol in addition to old age and smoking.

Recommendations: Combating precipitating factors of MI in Saudi Arabia can decrease the prevalence of the disease

Keywords: Myocardial Infarction, Taif City, Participating Factors.

INTRODUCTION

Myocardial infarction (MI), is a subset of acute coronary syndrome, in which there is damage to the cardiac muscle as demonstrated by increased cardiac Troponin levels in the setting of acute ischemia ⁽¹⁾. Myocardial infarction (MI) is a fatal disease caused by block in the oxygen supply of blood vessels of the heart muscles, leading to permanent heart muscle damage and death of its cells. This block is due to atherosclerosis in which plaque of fatty patches is precipitated on the inner wall of the coronary artery or one of its smaller branches. When the plaque is ruptured, the blood clot is formed inside the artery blocking the blood flow ⁽²⁾. According to world health organization (WHO) report published in 2014, 68% of global deaths annually related to non communicable diseases such as cardiovascular diseases (CVD), respiratory diseases, diabetes mellitus and cancer, with peak incidence of 40% in the age group from 30 - 70 years. Cardiovascular diseases constitute 31% of these deaths denoting that they are the leading cause of death ⁽³⁾. Risk factors of cardiovascular diseases can be classified into three categories the first one is behavioral factors as eating un healthy food, smoking, alcohol intake, and lack of physical exercise, the second category

is physical factors as high blood pressure, increased waist circumference and improper body mass index; fluctuation in body weight is associated with high mortality and high rate of cardiovascular events independent of other cardiovascular risk factors ⁽⁴⁾. The third category is biochemical factors as high blood pressure and lipids. First degree relatives of coronary artery disease patients have a high risk of getting cardiovascular diseases due to genetic factor in addition to environmental factors as life style, eating habits like dyslipidemia and glucose metabolism abnormalities, exercise and socio-economic status which make members of the same family more prone to non- communicable diseases ⁽⁵⁾. While the classic symptoms of a heart attack are chest pain and shortness of breath, the symptoms can be quite varied. The most common symptoms of a heart attack include: pressure or tightness in the chest, pain in the chest, back, jaw, and other areas of the upper body that lasts more than a few minutes or that goes away and comes back, shortness of breath, sweating, nausea, vomiting, anxiety, cough, dizziness and palpitation. 30% of population present with atypical symptoms, this is more predominant in women. So women above 75 years old have had an MI with little or no history of MI symptoms. Most myocardial

infarctions occur due to coronary artery disease ⁽⁶⁾. Diagnosis of myocardial infarction is done by lab tests as cardiac biomarkers mainly Troponin enzyme, Complete blood cell and lipid profile, in addition to Electrocardiography and Cardiac imaging ⁽⁷⁾. The main goal of management of myocardial infarction is early diagnosis. Initial therapy for acute myocardial infarction is directed toward restoration of perfusion as soon as possible to save as much as possible of myocardial muscles. Restoration of vessel perfusion may be achieved through medical or mechanical means as percutaneous coronary intervention (PCI), or coronary artery bypass graft (CABG) surgery. It is extremely important to distinguish between ST-elevation myocardial infarction or non ST-elevation myocardial infarction because management differs between these two types ⁽⁸⁾.

AIM OF WORK

The aim of this work is to assess the relationship between incidence of acute myocardial infarction and its participating factors such as food, life style, occupational stress, social habits and other risk factors for the disease.

PATIENTS AND METHODS

This is an observational, descriptive correlation questionnaire based study. 50 Saudi and non Saudi patients with acute myocardial infarction who were admitted in cardiac intensive care unit (CICU), medical ward and followed in out-patient department (OPD) were chosen from King Faisal Medical Center, cardiology department, Taif, Saudi Arabia from the first of March 2016 to the end of April 2016 (2 months duration). It is questionnaire

based study, patients were asked to respond to a self-administered questionnaire. Written permission from Faculty of medicine, Taif University was obtained before conduction of the research. Written permission from concerned authority in King Faisal Medical Center was obtained too. Data were disclosed except for research purpose. The individual consent from each person to participate in the study was a prerequisite for data collection. A verbal consent was taken from each participant. The participating Factors that are related to acute myocardial infarction were evaluated via a the questionnaire which measured the following variables: City, age, gender, BMI, BP, pulse, RR and O2 sat. in addition to closed questions about life style include: exercise, stress, occupation, smoking, food habits , cholesterol level and family history of MI. SPSS statistics (v. 21) analysis package was used to analyze the data.

The data were presented as tables and graphs. The qualitative variables were presented as frequency and percentage and the quantitative variables were presented as mean and standard deviation (SD) if the data were normally distributed and as median and interquartile range (IQR) if the data were not normally distributed.

To assess the significance of the association between variables, for qualitative variables, Chi-square and Fisher tests were used. For qualitative dichotomous and quantitative variables, independent t-test was used if the data were normally distributed or Man-Whitney test if the data were not normally distributed. The P-value was considered significant if it is less than 0.05. **The study was done after approval of ethical board of King Abdulaziz university.**

RESULTS

Table (1): shows personal data statistics

Parameter	(Mean ± Slandered deviation)	Minimum	maximum
Age	66.02±13.6	36	100
BMI	29.4±5.4	21.8	44
Systolic BP	145.8±27	102	200
Diastolic BP	76.74±11.4	47	99
Pulse	77.32±18.37	52.	171
Respiratory rate	19.5±6.5	13	61
Oxygen saturation	94.5±2.85	84	100

Table 1 shows the following results: the mean age of patients was 66.02 ± 13.6 , mean BMI was 29.4 ± 5.4 , mean systolic BP was 145.8 ± 27 , mean diastolic BP was 76.74 ± 11.4 , mean pulse was 77.32 ± 18.37 , mean respiratory rate was 19.5 ± 6.5 and the mean oxygen saturation was 94.5 ± 2.85 .

Figure 1: Shows personal data statistics

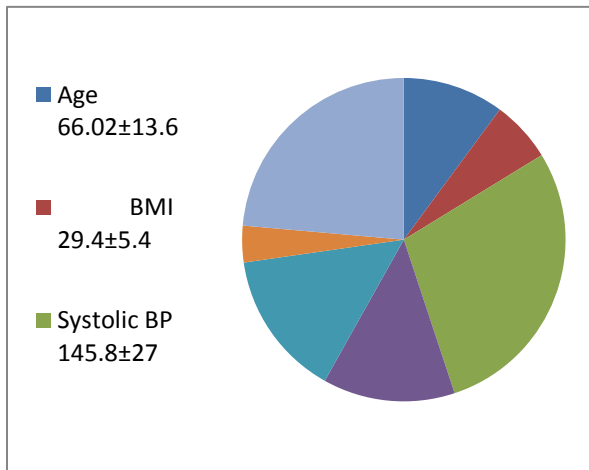


Table (2): Shows demographic data (percentage)

Sex	Male 30%	Female 70%
Residence	Live in Taif 86%	Live in other cities 14%

Table 2 shows that 30% were male patients and 70% were female, 86% of patients lived in Taif city and 14% lived in other cities

Figure 2: Shows demographic data (percentage) of patients

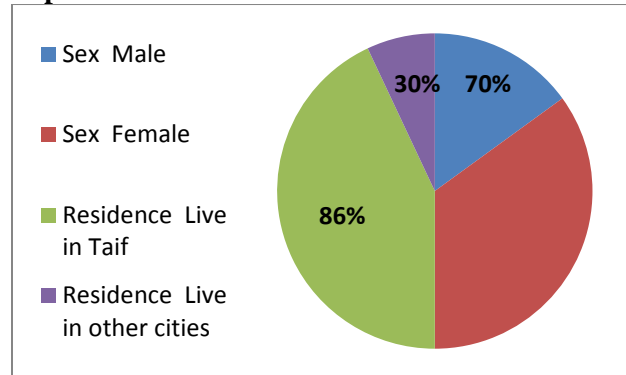


Table (3): Shows questionnaire statistics

Question	Yes	No	Don't know
Awareness that exercise prevent cardiac diseases (CD)	62%	12%	26%
Patients doing exercise every day within 30 min	52%	48%	
Stress	40%	60%	
Do stress affect the daily activity	28%	18%	54%
Jobs requiring heavy effort	16%	84%	
Smokers	22%	78%	
Passive smokers	34%	66%	
Choosing food with low fat	26%	72%	2%
Reading the component of food	10%	90%	
Knowledge of meaning of calories	24%	76%	
Choosing food according to component	24%	76%	
Choosing food according to coast	74%	24%	2%
Awareness that healthy food prevents CD	70%	18%	12%
Suffering from obesity	70%	30%	
Trying to keep ideal weight by healthy food & low fat	26%	74%	
Using animal oil / Using vegetable oil	90%	10%	
Awareness of having high cholesterol	78%	12%	10%
Family history of cholesterol	32%	58%	10%
Family history of MI	28%	70%	2%

The Prevalence of Acute Myocardial Infarction...

Table 3 shows that 62% of patients studied were aware that exercise (CD) while 12% were not, 52% of Patients were doing exercise every day within 30 min but 48% didn't, 40% of patients had stressing jobs while 60% hadn't, 28% of patients stress affects their daily activity, 18% were not affected and 54% Didn't know, 16% of patients their jobs requiring heavy effort while 84% not, 22% of patients were smokers and 78% were not, 34% of patients were passive smokers while 66% were not.

26% of patients chose low fat food, 72% didn't choose and 2% didn't know, 10% of patients read the food component while 90% did not, 24% of patients the meaning of calories but 76% didn't know, 24% of patients choose their food according

to its component and 76% did not, 74% of patients choose their food according to coast but 24% did not, 70% of patients had awareness that healthy food prevents CD while 30% were not aware, 70% of patients were suffering from obesity according to their opinion but 30% were not, 26% of patients were trying to keep ideal weight by healthy food & low fat but 74% did not, 90% of patients used animal oil in cooking while 10% were using vegetable oil, 78% of patients were aware of having high cholesterol level, 12% were not aware and 10% didn't know, 32% of patients had positive family history of high cholesterol, 58% were negative and 10% didn't know, 28% of patients had positive family history of MI, 70% were negative and 2% didn't know.

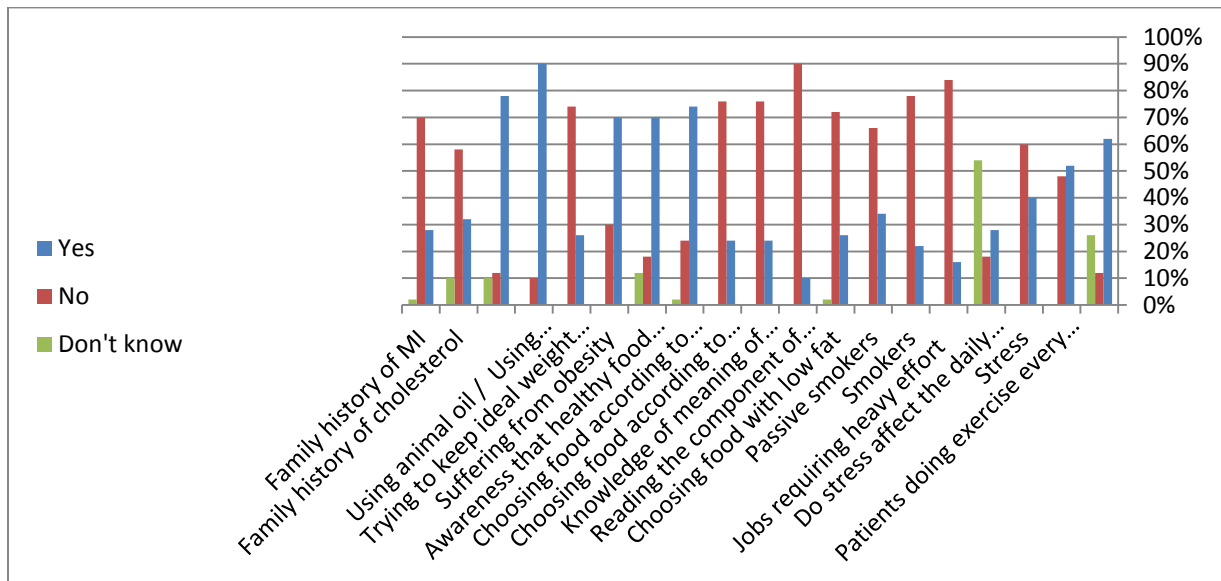


Figure (3): Shows questionnaire statistics

Table (4): Shows the Prevalence of Myocardial infarction in King Faisal Medical Center, cardiology department, Taif, Saudi Arabia from the first of March 2016 to the end of April 2016 (2 months duration)

Number of MI patients in the 2 months of research	Total number of patients admitted to King Faisal Medical Center, cardiology department in the same period of the research	Prevalence of MI patients in the 2 months of research
50 patients	3520 patients	1.4%

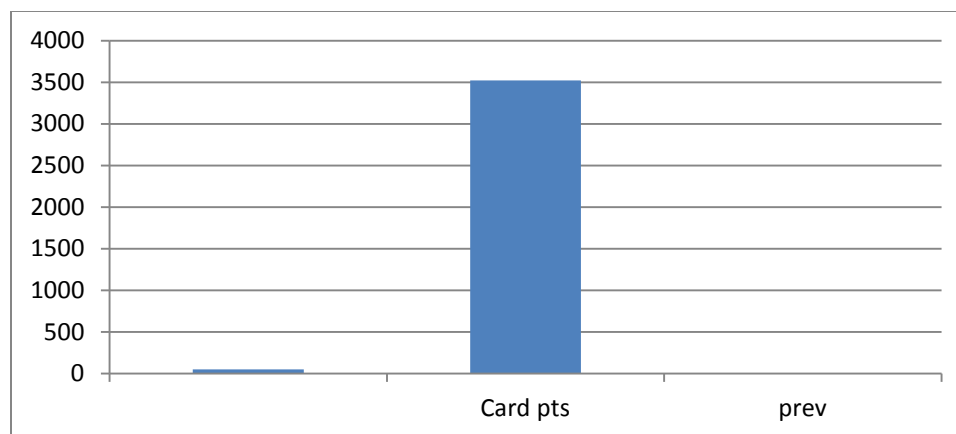


Figure (4): Shows the Prevalence of Myocardial infarction in King Faisal Medical Center, cardiology department, Taif, Saudi Arabia from the first of March 2016 to the end of April 2016 (2 months duration).

DISCUSSION

Acute coronary syndrome (ACS) describes the various forms of myocardial ischemia which comprises unstable angina (UA), non-ST elevated myocardial infarction (NSTEMI), or ST-elevated myocardial infarction (STEMI). The diagnosis of different forms of ACS is done by revision of clinical features, electrocardiogram (ECG) findings and evidence of biochemical markers of myocardial necrosis⁽⁹⁾. UA occurs when the ischemic symptoms are transient without elevations in biomarkers in the presence of some ECG changes⁽¹⁰⁾. Myocardial infarction (MI) occurs when there is evidence of myocardial necrosis resulting from acute myocardial ischemia. There are two forms of myocardial infarctions; (STEMI) is the more severe type which is characterized by persistent ECG findings of ST segment elevation; the second type is the NSTEMI without ST segment elevation in ECG⁽¹¹⁾. ACS is associated with enormous morbidity and mortality. Management of ACS is achieved either by initial conservative measures through antiplatelet, anticoagulation, β blockers, renin angiotensin system inhibitors, and HmG-coenzyme A reductase inhibitors or through an invasive approach including coronary revascularization⁽¹²⁾. In this study we assessed the relationship between incidence of acute myocardial infarction and its participating factors, 50 Saudi and non Saudi patients with acute MI who were admitted in cardiac intensive care unit (CICU), medical ward and followed in out-patient department (OPD) were chosen for this research. Prevalence of myocardial infarction in King Faisal hospital in Taif city for the 2 months of this research was 1.4 % among 3520

patients, these results were similar to the results of **Osama *et al.***⁽¹³⁾, he studied the prevalence of coronary artery anomalies in Qassim province detected by cardiac computed tomography angiography and deduced that the prevalence of coronary artery diseases was 1.029% among 2235 patients studied, between 2009 and 2015 years. On the contrary our results were quite different from the results of **Mendis *et al.***⁽¹⁴⁾ who searched for the prevalence of cardiovascular disease and associated risk factors among adult population in the gulf region in a systematic review of published articles between 1990 and 2014, he found that the prevalence of Coronary heart diseases (CHD) was reported to be 5.5% in Saudi Arabia. Regarding prevalence in the United States there was an overall decline in CHD prevalence in age adjusted group from 6.7% to 6.0% in the years 2006 to 2010 in the research of **Roger *et al.***⁽¹⁵⁾; heart disease and stroke statistics---2011 update, reporting from the American heart association denoting that the prevalence of MI in Saudi Arabia is much lower than that in the United States.

These variations in prevalence's of MI were explained by **Gregory *et al.***⁽¹⁶⁾. He attributed that the cause of this wide differences may be due to different dietary patterns, variation between rural and urban areas and other risk factors.

The mean age of our patients was 66.0 2 ± 13.6 ranging from 36-100, **Hernandez *et al.***⁽¹⁷⁾ searched for the epidemiological profile of Hispanics admitted with acute myocardial infarction in Puerto rico, in the years 2007, 2009 and 2011, the mean age of his patients admitted with MI was 67 \pm 13.6 years old. They found that women were older than men and had

different risk factors compared to men, these results were in accordance to ours. **Benstoem et al.** ⁽¹⁸⁾ studied remote ischemic preconditioning for coronary artery bypass grafting and found that the mean age of his patients was 64 ± 11.5 years old. The age incidence of MI was earlier in Saudi Arabia, **Khalid et al.** ⁽¹⁹⁾ **concluded** that the mean age \pm SD of his MI patients was 58 ± 12.9 years in Saudi nationals on searching the baseline characteristics, management practices, and in-hospital outcomes of patients with acute coronary syndromes in the Saudi project for assessment of coronary events (SPACE) registry. **Mazen et al.** ⁽²⁰⁾ also found the mean age of his patients was 53.9 ± 14.6 when searching for socio-demographic and racial differences in acute coronary syndrome on comparing between Saudi and South Asian Patients

On the contrary when studying acute myocardial infarction among Icelanders forty years old and younger 2005-2009, **Magnusson et al.** ⁽²¹⁾ found that the mean age of his patients was 36.7 ± 3.9 , which were different from our results. **Ahmadi et al.** ⁽²²⁾ explained that this difference seems to be due to positive family history of premature ischemic cardiac diseases may play an important risk factor for the occurrence of MI in young age and these patients should be cautiously treated.

In this study the body mass index (BMI) of MI patients was 29.4 ± 5.4 ranging from 21.8 to 44, **Magnusson et al.** ⁽²¹⁾ detected BMI of 26.1 ± 3.6 and 28.6 ± 4.8 kg/m^2 in his MI patients in the years 2005 and 2009 respectively in studying acute myocardial infarction among Icelanders forty years old and younger 2005-2009, which were similar to our results. The results of **Emily et al.** ⁽²³⁾ were also in accordance to our results, they studied the body mass index and mortality in acute myocardial infarction patients and found that the median BMI of patients enrolled in the study was 28.6; they also found that the BMI was inversely associated with crude 1year mortality. On the other hand **Hiroshi et al.** ⁽²⁴⁾ had a baseline mean body mass indices for men and women of 23.0 and 23.4 kg/m^2 , respectively when searching for body mass index and risk of stroke and myocardial infarction in a relatively lean population. They concluded that overweight/obesity was associated with an increased risk of cerebral infarction and hemorrhage in men and women and myocardial infarction in men and stated that weight control may have the potential to prevent both stroke and myocardial infarction in Japan. **Borgeraas et al.** ⁽²⁵⁾ had some explanations. They studied the association of

body mass index with risk of acute myocardial infarction and mortality in Norwegian male and female patients with suspected stable angina pectoris in a prospective cohort study. They found that the mean BMI was 26.8 ± 3.9 kg/m^2 in his study, 34% was normal weight, 48% overweight and 19% obese, They followed up his patients and found that a total of 337 (8.2%) experienced an acute myocardial infarction (AMI) and 302 (7.3%) patients died. They mentioned that comparing normal weight subjects with obese men showed an increased risk of AMI and cardiovascular deaths, while overweight women had a decreased risk of AMI. These findings may potentially explain some of the result variation in previous studies reporting on the obesity paradox. In our study the mean blood pressure of patients was 145.8 ± 27 / 76.74 ± 11.4 with mainly systolic hypertension, **Rapsomaniki et al.** ⁽²⁶⁾ agreed with our results .

They stated that hypertension is the most important risk factor for premature cardiovascular diseases, being more common than diabetes, cigarette smoking and dyslipidemia, They mentioned that hypertension accounts for about 54% of all strokes and 47 % of all ischemic heart diseases, Moreover, They said that the risk of both coronary disease and stroke increases progressively with increases in blood pressure above 115/75 mmHg, as he observed from numerous epidemiologic studies. They also mentioned that the increase in cardiovascular diseases is common in elevated systolic pressure in patients over 60 years and elevated diastolic pressure in younger individuals. **Rivera and Luna** ⁽²⁷⁾ also agreed with our results. They concluded that hypertension is the main cause of ischemic heart disease and stroke, and it is the 2nd leading cause of disability in the world.

A questionnaire was made in this research to detect the most common risk factors precipitating MI and to measure the awareness of patients about the risk factors of the disease, 62% of our patients were aware about the role of physical activity and exercise in preventing cardiac diseases, **Vazquez and Marques** ⁽²⁸⁾ concluded in their research of descriptive and comparative study of cardiovascular risk factors and physical activity in patients with acute coronary syndrome that physical activity improves triglycerides levels and body mass index, When taking in consideration that 70% of our patients were suffering from obesity we advise patients to keep physically active to improve their disease. Stress was a major factor of ACS in this research constituting 40% of patients with 28% of patients were aware about stress

as a risk factor for acute infarction **Tofler *et al.*** ⁽²⁹⁾ found that emotional stress, anger, heavy meal and sexual activity were the most common risk factors of ACS in his research of Triggers and Timing of Acute Coronary Syndromes which were in accordance to our results. As regard smoking, we had 22% and 34% of patients as smokers and passive smokers respectively, **Suzuki *et al.*** ⁽³⁰⁾ explained that smoking was associated with the promotion of atherosclerosis or thromboembolism in elderly patients, while in young patients it was associated with bleeding. On studying the effects of national smoking ban on hospital admissions for cardiovascular diseases in a time-series analysis in Taiwan **Yang *et al.*** ⁽³¹⁾ found that there was a significant reduction in hospital admissions for ischemic heart diseases in Taiwan following smoking bans. Studying the results from the first Jordanian Percutaneous coronary intervention study **Ayman *et al.*** ⁽³²⁾ suggested that nine potentially modifiable risk factors including: smoking, HTN, DM, waist-to-hip ratio, dietary patterns, physical activity, alcohol consumption, plasma apolipoproteins, and psychosocial factors account for 96% of the population-attributable risk of myocardial infarction in women. They also stated that the prevalence of risk factors is greater in women than in men, and women are more likely to have a higher number of cardiovascular risk factors, these results were in accordance to our results as 30% of our patients were male and 70% were female. Finally the present research showed that the main risk factors of ACS in our patients were hypertension, Stress, obesity; high cholesterol diet and positive family history of cholesterol in addition to old age and smoking.

CONCLUSION

The main risk factors of ACS in our patients were hypertension, Stress, obesity; high cholesterol diet and positive family history of cholesterol in addition to old age and smoking.

RECOMMENDATIONS

Combating precipitating factors of MI in Saudi Arabia can decrease the prevalence of the disease.

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