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Research Article

Analysis of frequency of increased waist to hip ratio in patients of acute myocardial infarction

Huma Naeem Tareen[1], Javaria Jamil[2] and Muneeba Rasheed[3]

[1]FCPS Cardiology, Assistant professor BMC Quetta.
[2]Nishter Medical University
[3]Bahawal Victoria Hospital, Bahawalpur

Corresponding author: Dr Huma Naeem Tareen, FCPS, Cardiology, Assistant Professor BMC Quetta.

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ABSTRACT

Introduction: Worldwide, incidence of Acute Myocardial Infarction (AMI) has been increasing over the years and now reflected as the leading cause of death universally. Overweight and obesity have been recognized as a major risk factor for coronary heart disease (CHD) with increasing prevalence.**Aims and objectives:** The main objective of the study is to analyze the frequency of increased waist to hip ratio in patients of acute myocardial infarction in Pakistan.**Material and methods:** This cross sectional study was conducted in BMC Quetta during January 2018 October 2018. The data was collected from 100 patients of both genders. The age range was 25 to 60 years. Patients taking lipid lowering drugs and patients of chronic renal failure or chronic liver disease were excluded from the study. Waist was measured at narrowest part below rib cage and hip was measured at widest part of buttocks. Waist and hip of every patient was measured and waist hip ratio was calculated from those readings. The demographic values of all the patients were collected for further analysis. The patients' waist and hip circumferences were measured in centimeters. Then a ratio of waist to hip was calculated from these two measurements for each patient.**Results:** The data was collected from 100 patients of both genders. The mean age was 45.5±4.65 years. This study demonstrated that most of the patients were male. Regarding distribution of normal and abnormal waist to hip ratio in patients presenting with acute myocardial infarction. It was noted that 77.9% patients had normal waist to hip ratio while remaining 22.1% patients had abnormal waist to hip ratio. The study population was also evaluated for other risk factors. Smoking was found to be the commonest risk factor as 65.78% patients were smokers.**Conclusion:** It is concluded that WHR can be deemed an excellent predictor of MI risk, as there is a significantly increased risk of MI among patients with a high WHR. The predictive effect of WHR on the risk of MI is even more significant in men than in women.

Key words: Waist, ratio, Smokers, Women

INTRODUCTION

Worldwide, incidence of Acute Myocardial Infarction (AMI) has been increasing over the years and now reflected as the leading cause of death universally.Overweight and obesity have been recognized as a major risk factor for coronary heart disease (CHD) with increasing prevalence. Experts have predicted that the current growth rate of obesity (an estimated 7% increase

in men and 10% increase in women by 2020) will lead to an increase in the number of CHD events by 14% in 2035[1]. Among the various types of CHD, myocardial infarction (MI) is associated with a high incidence rate, acute onset, and increased lethality, thereby posing a serious threat to the life of the patient.

Body mass index (BMI) can serve as a marker indicating the general obesity, and the relationship between MI and BMI has been intensively investigated, but there are still certain limitations requiring our concern[2]. In relation with BMI, there seem to be closer correlations of the anthropometric measures of abdominal obesity (such as the waist circumference [WC], waist-to-height ratio [WHtR], waist-hip ratio (WHR), and the sagittal abdominal diameter) with the metabolic risk factors, MI events, and death events[3].Moreover, excessive fat mass in the body, rather than excessive body weight, accounts for the leading cause of the increased risk of MI among the obese population[4].Consequently, some studies indicate that central obesity index, WC, WHtR, and WHR are the risk factors for predicting MI, which can also overcome the limitations of BMI[5].

Waist-to-hip ratio is a novel, simple independent predictor of vascular endothelial dysfunction (ED). ED can be the first clinical presentation of subclinical atherosclerosis. WHR has been also linked to CAD independently of BMI and other traditional risk factors even in normal-weight or lean population[6]. WHR may be particularly important risk factors than other anthropometric measures for atherosclerosis.The non-invasive devices to measure WHR in particular is becoming increasingly common in clinical practice[7]. Inflammation plays a role in the pathogenesis of many inflammatory diseases like systemic lupus erythematosus, Behçet's disease where WHR changes may occur. Obstructive sleep apnea syndrome may be associated with increased cardiovascular morbidity and mortality[8]. WHR can also be affected by the peripheral artery disease, previous surgical history, trauma, cancer, immobilization, ulcerative colitis, celiac disease, alcohol consumption, hypercholesterolemia, hypothyroidism and older age[9].

Aims and objectives

The main objective of the study is to analyze the frequency of increased waist to hip ratio in patients of acute myocardial infarction in Pakistan.

MATERIAL AND METHODS

This cross sectional study was conducted in BMC Quetta during January 2018 October 2018. The data was collected from 100 patients of both genders. The age range was 25 to 60 years. Patients taking lipid lowering drugs and patients of chronic renal failure or chronic liver disease were excluded from the study.

Data collection

Waist was measured at narrowest part below rib cage and hip was measured at widest part of buttocks. Waist and hip of every patient was measured and waist hip ratio was calculated from those readings. The demographic values of all the patients were collected for further analysis. The patients' waist and hip circumferences were measured in centimeters. Then a ratio of waist to hip was calculated from these two measurements for each patient. Waist hip ratio was measured for estimation of fat distribution and >1 was considered abnormal.

Statistical Analysis

Statistical analysis (Anova Test and Post Hoc) was performed using the SPSS software program (17.0). All results were expressed as the mean ± standard deviation (SD). As P value <0.05 was considered to be statistically significant.

RESULTS

The data was collected from 100 patients of both genders. The mean age was 45.5±4.65 years. This study demonstrated that most of the patients were male. Regarding distribution of normal and abnormal waist to hip ratio in patients presenting

with acute myocardial infarction. It was noted that 77.9% patients had normal waist to hip ratio while remaining 22.1% patients had abnormal waist to hip ratio. The study population was also evaluated for other risk factors. Smoking was found to be the commonest risk factor as 65.78% patients were smokers.

Table 01: Demographic characteristics of patients

Variables	% age
Age	45.5±4.65
Male	75
Female	25
Smoking	65.78
Hypertension	34.9
Metabolic syndrome	45.98
History of heart diseases	18.9

There were 34.9% of the patients who had history of hypertension. Other risk factors like metabolic syndrome was seen in 45.98% of the patients, history of ischemic heart disease in 36.3% of the patients and family history of ischemic heart disease in 18.9% of the patients.

Table 02: Waist to hip ratio of selected patients

Waist to Hip ratio	Age (Years)	Gender	
		Male (%)	Female (%)
Normal	25-35	15.9	3.1
	35-45	45.89	46.98
	45-60	40.91	51.24
Abnormal	25-35	37.13	20.65
	35-45	33.45	21.98
	45-60	29.19	21.76

DISCUSSION

Central obesity, which refers to a high WHR, likely contributes to MI via multiple pathways involving oxidative stress and inflammation, steroid hormones, free fatty acids, and altered production and function of adipocyte-derived hormones[10].Recent cardiac metabolism imaging studies conducted in large cohort studies have shown that visceral fat hyperplasia can exceed its storage capacity and become oversaturated, leading to a spillover of lipids that are then stored in normally lean tissues such as the heart, liver, and intrathoracic fat, contributing significantly to cardiac and metabolic abnormalities[11]. In addition, adipose tissue fat cells are involved in the promotion of atherosclerotic regulation processes, and excessive visceral fat is associated with insulin resistance, hypertriglyceridemia, highly atherogenic small LDL particles, and low HDL levels, all proatherogenic factors[12]. Subsequently, endothelial vasomotor dysfunction, a hypercoagulable state, and dyslipidemia are triggered, eventually leading to MI[13].

In light of these results, first, the ability of WHR to predict MI risk is evident, and healthcare professionals should consider the pivotal role of WHR in identifying populations at higher risk of MI, especially in women. Second, further work is needed to discern the best practice guidelines for capturing the various dimensions of WHR that contribute to MI risk[14]. Third, the potential risk of high WHR should be included in the health education of patients so that patients understand that a normal body weight does not preclude the presence of abdominal obesity. Fourth, this study presents a new challenge to medical rehabilitation professionals involved in monitoring the physical activity of obese patients in that they should pay more attention to the patient's WHR and not just the BMI[15]. Finally, as a central obesity index, WHR is more clinically relevant than BMI and merits increased attention, especially in terms of the acute onset of disease, to reduce the risk of morbidity.

The heterogeneity of the studies must be addressed because it may affect the justification for pooling the data into one analysis[16]. In the present meta-analysis, statistical heterogeneity may have been caused by clinical heterogeneity, such as differences in the study population and different WHR cutoff points, as well as by different study quality characteristics. Among them, the high heterogeneity of Yusuf et al's researchmay be attributed to the fact that it was a study with a large sample size involving 52 countries[17]. Although the major influencing factors such as age, sex, and geographical location

were adjusted for, there are still some differences in methodological quality compared with the other studies. However, the statistical tests of heterogeneity were within the acceptable range for the pooling of studies[18].

CONCLUSION

It is concluded that WHR can be deemed an excellent predictor of MI risk, as there is a significantly increased risk of MI among patients with a high WHR. The predictive effect of WHR on the risk of MI is even more significant in men than in women. Thus, the measurement of WHR may have clinical utility in MI risk assessments, particularly for those patients with elevated WHRs.

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