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Research Article

**THE IMPORTANCE OF THE RATIO OF TRIGLYCERIDES  
TO HIGH DENSITY LIPOPROTEINS CHOLESTEROL AS A  
RISK FACTOR FOR CORONARY ARTERY DISEASE IN  
FEMALES**<sup>1</sup>Dr Zainab Mustansar, <sup>2</sup>Dr Zainab Mehreen, <sup>3</sup>Dr Soha Khan<sup>1</sup>Nishtar Medical University and Hospital, Multan<sup>2</sup>Nishtar Medical University and Hospital, Multan<sup>3</sup>Nishtar Medical University and Hospital, Multan**Article Received:** April 2020**Accepted:** May 2020**Published:** June 2020**Abstract:**

**Aim:** To assess the role of high-density lipoprotein cholesterol (TG / HDL\_C) triglycerides as a risk factor for coronary heart disease in females.

**Study design:** A cross-sectional study.

**Place and duration of the study:** In the Medicine Unit I of Nishtar Hospital Multan for one year duration from February 2019 to February 2020.

**Methods:** The study was conducted on 100 women with known heart problems to assess angina and 50 controls were referred to the exercise tolerance test (ETT). Fasting blood samples determined the total cholesterol (TC), triglyceride (TG), high density lipoprotein (HDL\_C), low density lipoprotein (LDL\_C) cholesterol and analyzed for correlation.

**Results:** The lipid profile of patients (TG and HDL\_C) was changed. The ratio of high density lipoprotein cholesterol (TG / HDL\_C) to serum triglycerides has been found to be a risk factor for coronary heart disease in women.

**Conclusion:** Studies have shown that high-density lipoprotein cholesterol triglyceride is associated with coronary heart disease.

**Key words:** coronary artery disease, cholesterol, triglyceride.

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**INTRODUCTION:**

Coronary heart disease (CHD) is one of the most common causes of female death, especially in developed countries such as the United States. Pakistanis are part of an ethnic group that suffers from the highest rate of coronary artery disease compared to everyone in the world. CAD manifests itself at a young age with a significant reduction in gender awareness. The increase in CAD incidence in the local population is even greater in a population of women with similar mortality over the decade. Important risk factors have been identified, such as diabetes, hypertension, obesity and high serum cholesterol. Various studies have been conducted in Pakistan which show that the likelihood of CHD is constantly increasing due to various risk factors. In postmenopausal women, a decrease in estradiol levels and a corresponding decrease in HDL-C have been observed, which may be responsible for an increased risk of post-menopausal coronary heart disease. Low cholesterol high density lipoprotein (HDL-C) is important in the development of coronary heart disease, and the role of hypertriglyceridemia is controversial. Recent analyzes show that hypertriglyceridemia is an independent prognostic factor for coronary artery disease and may be a stronger risk factor for women than for men. Limited data is available on the prognostic use of the TG / HDL-C ratio. Gaziano et al. They were the first to conduct a case-control study and reported that this indicator strongly predicts the risk of myocardial infarction in both sexes. The first TG / HDL-C related mortality study, published in August 2009, additionally highlighted the importance of abnormal TG / HDL-C indicators, where the authors are at risk of mortality in women with suspected myocardial ischemia TG / HDL-C ratio C. Despite these global studies, no studies have been conducted to predict a worse outcome for women in the TGD / HDL-C ratio, but women make up a significant number of patients with CHD. This study was conducted to determine whether CHD in women predicts the TG / HDL-C ratio.

**PATIENTS AND METHODS:**

This study was held in the Medicine Unit I of Nishtar Hospital Multan for one year duration from February 2019 to February 2020. Samples were taken from 150 patients referred for exercise tolerance test (ETT) and admitted to the coronary care unit (CCU). Patients were divided into two groups as follows;

a) ETT group (women referred to ETT) based on the incidence of CHD in women of 56% (Khan et al., 2005) and beta error of 10%, calculated sample size according to formula  $Z_2(p)(q) / E^2$  it's 95 cases. 100 cases of patients admitted for myocardial infarction in CCU. Inclusion criteria were a patient of all ages directed to ETT for angina / chest pain,

with both positive and negative ETT results and no prior history of MI. For the past two weeks, patients have not used any lipid modifying drugs.

b) CCU Group Women suffering from myocardial infarction (MI) were admitted to CCU. Women in this group did not take any lipid-altering drugs. The data was collected on a previously designed Performa. Research variables included basic demographics, reproduction history, nutritional assessment, past, and current complaints for both groups. ETT results, both positive and negative, and MI patients were recorded, regardless of whether they survived or died to allow comparisons between groups. Blood was collected from women who came to ETT on an empty stomach and patients who were admitted to CCU with MI using standard aseptic technique. Blood was collected and quickly transferred by gentle disposal in clean centrifuge tubes. They were then placed in a centrifuge machine and centrifuged to obtain pure serum. This serum was used to measure lipid profile, including total serum / plasma cholesterol, HDL-C and triglycerides. All these measurements were determined using standard kits, while LDL-C was calculated using Friedewald's formula. The chi-square test was used to compare the frequencies, while the T test was used to compare the means between the two groups  $p \leq 0.05$ .

**RESULTS:**

A total of 150 people selected according to the inclusion and exclusion criteria were tested. 100 patients had a positive history of coronary artery disease (CHD) and the rest was a control group (50). The mean  $\pm$  SD serum concentrations of control triglycerides (ETT related) and cases (CCU patients) were  $2.14 \pm 0.80$  and  $1.68 \pm 0.55$  mmol / dL, respectively. The mean SD triglyceride concentration was significantly ( $p = 0.01$ ) reduced in the case group. The mean SD HDL\_C concentration in the control serum (relative to ETT) and cases (CCU patients) were  $1.029 \pm 0.36$  and  $0.930 \pm 0.238$  mmol / dL, respectively. The mean SD HDL\_C concentration was significantly ( $p = 0.03$ ) reduced in the case group. The mean control  $\pm$  SD TG / HDL\_C ratio (relative to ETT) and cases (CCU patients) was  $2.32 \pm 0.17$  and  $1.88 \pm 0.652$  mmol / dL, respectively. The mean SD TAT / HDL-c RATIO was significantly ( $p = 0.002$ ) reduced. The mean  $\pm$  SD concentration in the LDL\_C control (ETT reference) and cases (CCU patients) were  $3.55 \pm 0.42$  and  $3.20 \pm 1.22$  mmol / dL, respectively. The mean SD LDL\_C concentration was slightly ( $p = 0.06$ ) reduced. The mean  $\pm$  SD total cholesterol in control serum (relative to ETT) and cases (CCU patients) were  $5.60 \pm 0.55$  and  $4.89 \pm 1.29$  mmol / dL, respectively. The mean SD triglyceride concentration slightly ( $p = 0.17$ ) decreased in the case group.

**Table: Comparison of mean±standard deviation and p value of triglyceride, HDL\_C, ratio of TG/HDL\_C, LDL\_C and total cholesterol between controls (ETT group) and cases (CCU Patients).**

Variables	Controls (ETT)	Cases (CCU)	P value
Triglyceride in mmol/dl	2.14±.805	1.689±.552	0.010
High Density lipoprotein cholesterol in mmol/dl	1.029±0.368	0.930±.238	0.033
TG / HDL-C Ratio	2.32±1.17	1.88±.652	0.002
Low density Lipoprotein in mmol/dl	3.55±1.49	3.20±1.22	0.065
Total cholesterol in mmol/dl	5.606±1.55	4.899±1.29	0.175

**DISCUSSION:**

In underdeveloped countries, coronary heart disease is the leading cause of death. In 2002, nearly one hundred thousand people in Pakistan suffered an acute myocardial infarction. A strong relationship between the lipid profile and coronary artery disease has been shown in several studies and is considered to be classic factors for hypercholesterolemia, hypertriglyceridemia and reduced HDL-C atherosclerosis. According to the Framingham Heart Study, half of the risk of coronary event is due to known risk factors, particularly high LDL levels. Among the modifiable risk factors, lowering LDL levels is associated with a lower incidence of coronary heart disease. The major pathological changes identified in patients with coronary artery disease were strongly associated with dyslipidemia and have recently been recognized as an inflammatory process. Factors that support atherosclerosis include hypertension and dyslipidemia. Because there is very little TG / HDL data in the Pakistani population and it is not particularly available in the Hazara section, this study was conducted to investigate the relationship of TG / HDL ratio in women with CHD. In this study, 100 cases of CHD and 50 control age and sex matched lipid profiles were examined, namely CT, TG, HDL-C, LDL-C and fasting glucose levels. This study shows that the lipid profile of a patient with ischemic heart disease (CHD) is within normal limits and the main findings of TG / HDL-C are also abnormal, but cholesterol and LDL\_C are within the normal range. The same study in the USA, Bittner et al. (2009). According to his research, the lipid profile of patients with coronary artery disease, i.e. total cholesterol, TG, LDL and HDL, increases from the normal range. According to our research, the triglyceride / HDL\_C ratio is associated with the occurrence of coronary heart disease in women. The TG / HDL\_C ratio was found to be a risk factor for coronary artery disease in women, but total and LDL\_C cholesterol were in the normal range.

**CONCLUSION:**

Based on the results and comparison of the serum TG / HDL-C ratio with modern studies confirming its importance as a risk factor for CHD and other atherosclerosis complications, it was found that routine screening was performed to detect the abnormal indicator. TG to HDL\_C are highly specific and should be recommended, but total serum cholesterol and LDL\_C did not predict CAD in this study. TG / HDL-C screening may be recommended for women with thromboembolic disease without a traditional risk factor or who have a family history of early CHD.

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