

# PATTERN OF DYSLIPIDEMIA IN YOUNG PATIENTS WITH ACUTE ST ELEVATION MYOCARDIAL INFARCTION

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## ABSTRACT

**Background:** Dyslipidemia is one of the modifiable risk factors of coronary heart disease. **Objective:** To determine the pattern of dyslipidemia in young patients with dyslipidemia. **Methodology:** A total of 120 patients, 20 to 40 years of age of either gender with acute Myocardial Infarction were included in this cross sectional study, from 1<sup>st</sup> January to 30<sup>th</sup> August 2015. Patients with history of ischemic heart disease, chronic renal failure, hypothyroidism, diabetes mellitus, and were hypertensive and on statin therapy were excluded. Venous blood sample was taken and sent to laboratory for analysis of following parameter serum total cholesterol level, serum triglycerides level, low density lipoprotein (LDL) and high density lipoprotein (HDL). This data entered was and analyzed and using SPSS version 16. **Results:** Mean age was  $34.13 \pm 4.57$  years. Out of these 120 patients, 80.83% were males and 19.17% were females with male to female ratio of 4.22:1. Dyslipidemia was present in 73 (60.83%) patients while 47 (39.17%) has shown normal lipid profile. Among total patients hypertriglyceridemia was present (45%) followed by hypercholesterolemia (36.67%), raised LDL (25.83%) and low HDL (10.83%). **Conclusion:** This study concluded that there is a high frequency of dyslipidemia in young patients presenting with acute myocardial infarction.

**Keywords:** Dyslipidemia, Hypercholesterolemia, Hypertriglyceridemia, Myocardial infarction

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## INTRODUCTION

Acute myocardial infarction (AMI) is one of the causes of death and unhealthiness in globally.<sup>1,2,3</sup> The interheart study reported that the risk of MI is almost entirely attributable to modifiable CV risk factors<sup>4</sup> like dyslipidemia, smoking, hypertension psychosocial stress, physical inactivity, poor diet, and abstinence from alcohol.<sup>5,6</sup> Dyslipidemia refers to lipoprotein disorders detected by laboratory tests, and usually occur without signs or symptoms during childhood and young adult age.<sup>6</sup>

Disorders in lipid metabolism (dyslipidemia) can result in premature atherosclerosis, leading to the development of cardiovascular disease.<sup>7</sup> It has recently been pointed out that there is an epidemic of cardiovascular disease in urban South asian.<sup>8</sup> Pakistan being part of this ethnic group has very high rates of coronary artery disease.<sup>9</sup> Dyslipidemia being modifiable risk factors of coronary heart disease needs special focus.<sup>10</sup> Although there is conflicting information for causative factors as for as total lipids and serum cholesterol are concerned.<sup>11,12</sup>

It reported that cholesterol levels are no longer valid after 24 hours from presentation of acute myocardial infarction as it causes a rapid decline

during the first 24 hours. The clear mechanism behind these changes awaits further studies.<sup>13,14,15,16</sup>

Studies on middle-aged men demonstrated that a sigmoid relationship (curvilinear) between total serum cholesterol level and prevalence of coronary artery disease especially in total cholesterol more than 240 mg/dl.<sup>17</sup>

High frequency of dyslipidemia is reported in many others studies.<sup>18,19,20</sup> A particular pattern, termed the atherogenic lipid triad, is more common than others, and consists of the co-existence of increased very low density lipoprotein (VLDL) remnants manifested as mildly elevated triglycerides (TG), increased small dense low-density lipoprotein (LDL) particles, and reduced high density lipoprotein-cholesterol (HDL-C) levels.<sup>21</sup> This study was conducted to find the pattern of dyslipidemia in young patients of myocardial infarction.

## METHODOLOGY

This was a cross sectional study conducted from 1<sup>st</sup> January to 30<sup>th</sup> August 2015. Total number of 120 patients with Myocardial Infarction between 20 to 40 years of age, an acute (within 24 hours) onset of typical chest pain and ST elevation in at least 2 contiguous leads of  $\geq 2$ mm admitted to the Department of Cardiology, Ch. Pervaiz Elahi

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Institute of Cardiology, Multan were selected. Patients excluded from study were presentation more than 24 hours after developing myocardial infarction, patients already on statin therapy.(on history), patients diagnosed as case of hypothyroidism.(on laboratory evidence), patients with diabetes mellitus (fasting blood sugar level>126mg/dl or already on hypoglycemic agents).The demographic information like name, age, sex and address was recorded.

After taking informed written consent and approval from Institutional Review Board, venous blood samples was taken and sent to laboratory for analysis of following parameter; serum total cholesterol level, serum triglycerides level, low density lipoprotein (LDL) and high density lipoprotein (HDL). Lipid profile was considered deranged if any one of the followings was present:

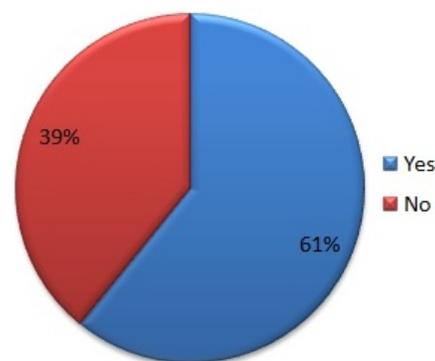
- Total Cholesterol level >200mg/dl.
- Triglyceride level >150mg/dl.
- High density lipoprotein (HDL) <40mg/dl in males and <50 mg/dl in females.
- Low density lipoprotein (LDL) >130 mg/dl

Data was entered and analyzed using computer program SPSS version 16.0. Descriptive statistics was applied to calculate mean and standard deviation for the age of the patients. Frequencies and percentages were calculated for categorical variables such as gender and outcome (increased cholesterol, triglyceride and low density lipoprotein levels and decreased high density lipoprotein level). Confounding variables like age and gender were controlled by stratification and chi square test was applied for comparison and p-value  $\leq 0.05$  was considered as significant.

## RESULTS

Age range in this study was 20 to 40 years with mean age of  $34.13 \pm 4.57$  years. Out of these 120 patients, 97 (80.83%) were males and 23 (19.17%) were females with male to female ratio of 4.22:1. Dyslipidemia was present in 73 (60.83%) patients while 47 (39.17%) had shown normal lipid profile. Almost half of patients (45%) have hypertriglyceridemia followed by hypercholesterolemia (36.67%), raised LDL (25.83%) and low HDL (10.83%) as shown in table I. Stratification of dyslipidemia with age is shown in Table II. While gender stratification is shown in Table III.

**Figure I: Frequency of dyslipidemia.**



**Table I: Lipid abnormalities in Acute MI patients (n=120)**

Dyslipidemia	Frequency	% age
Raised Total Cholesterol	44	36.67
Raised Triglycerides	54	45.0
Raised Low density Lipoprotein (LDL)	31	25.83
Low High density Lipoprotein(HDL)	13	10.83

**Table II: Dyslipidemia stratified according to age groups.**

Age (years)	Dyslipidemia			P.Value
	YES No.(%age)	NO No.(%age)	Total	
20-30	13 (38.24%)	21 (61.76%)	34 (100%)	0.001
31-40	60 (79.77%)	26 (30.23%)	86 (100%)	

**Table III: Stratification of Gender with respect to dyslipidemia**

Age (years)	Dyslipidemia			P. Value
	Yes No.(% age)	No No. (% age)	Total	
Male	68 (70.10%)	29 (29.90%)	97 (100%)	0.000
Female	05 (21.74%)	18 (78.26%)	23 (100%)	

## DISCUSSION

Dyslipidemia, as a risk factor of CVD, is generally defined as the total cholesterol, LDL, triglycerides, apo B or Lp (a) levels above the 90th percentile or HDL and apo A levels below the 10th percentile of the general population.<sup>22,23</sup>

Among the main risk factors, among dyslipidemia, includes especially increase in LDL levels and decrease in HDL concentrations. Elevation of total cholesterol (TC) and low-density lipoprotein-cholesterol (LDL-C) has received most attention, particularly because it can be modified by lifestyle changes and drug therapies. The evidence showing

that reducing TC and LDL-C can prevent CVD is strong and compelling, based on results from multiple randomized controlled trials (RCTs). TC and LDL-C levels continue therefore to constitute the primary targets of therapy.<sup>21</sup> A study was conducted to determine the frequencies (pattern) of different lipid parameters (total cholesterol, high density lipoprotein (HDL)-cholesterol, low density lipoprotein (LDL)-cholesterol and triglycerides) in serum of young patients (20-40 years of age) with acute myocardial infarction during the first 24 hours. The mean age of patients in our study was  $34.13 \pm 4.57$  years which was very much comparable with Zaman Q et al<sup>18</sup> and Tamrakar R et al<sup>24</sup> study who had a mean age of 35 and 34 years respectively but a little higher than Alizadehas A et al<sup>25</sup> who had a mean age of 31 years. Acute myocardial infarction is a disease that is known to predominantly affect males. In the present study, we have found a male predominance (male: female ratio was 4.22:1) as was also observed in many previous studies.<sup>18,19,24,25</sup>

Dyslipidemia may be more detrimental for men compared with women; however, to date, a difference due to sex and hormones has not been established. In our study, dyslipidemia was present in 73 (60.83%) patients while 47 (39.17%) has shown normal lipid profile. Majority of patients (45.0%) have shown hypertriglyceridemia followed by hypercholesterolemia (36.67%), raised LDL (25.83%) and low HDL (10.83%). These results are very much similar to the findings of Zaman Q et al<sup>18</sup> who had found hypertriglyceridaemia as most common lipid abnormality in patients with dyslipidaemia as it was found in 68.1% patients; followed by raised serum VLDL, hypercholesterolemia, raised serum LDL and low serum HDL found in 53.2%, 34.0%, 8.5% and 4.3% patients respectively. A study conducted by Iqbal et al in patients with acute myocardial infarction from two tertiary care hospitals in Pakistan reported frequencies of hyper-cholesterolemia, hypertriglyceridemia, low high density lipoprotein cholesterol and isolated low high density lipoprotein cholesterol were found to be 30.6%, 30.1%, 48.6% and 34.1% respectively.<sup>19</sup> In normal individuals from different communities, plasma levels of lipids vary due to differences in genetic background and diet. In a study for more than 30 countries in different regions of WHO coverage except the US, the percentage of

hypercholesterolemia for individuals aged between 35-64 years and total cholesterol levels between 5.2-7.8 mmol/l (approximately 200- 300 mg/dl) was found to be lowest (20%) among the men in China-Beijing and highest (76%) in France-Strasbourg.<sup>2</sup> The lowest percent of women with hypercholesterolemia (5%) was in Australia-Perth population and the highest percent (76%) was observed in Germany- Bremen. On the other hand, Rao AH et al<sup>26</sup> has shown prevalence of hypercholesterolemia, hypertriglyceridemia and low HDL cholesterol was 82.4%, 77% and 78% respectively, which is very much larger compared to our study and previous study. Tamrakar R et al<sup>24</sup> also found hypertriglyceridemia and low HDL levels in young patients. Similar finding has also been reported in other studies of acute myocardial infarction patients under age 45 years.<sup>27</sup> A meta-analysis of 16 prospective epidemiologic studies suggests that an elevated TG concentration is an independent risk factor for coronary artery disease.<sup>28</sup> The high levels of triglycerides in coronary heart disease (CHD) have also been reported among Indians by Gupta et al<sup>29</sup> and among Egyptians by Metwalli et al.<sup>30</sup> The increased levels of triglycerides in Pakistani, Indian and Egyptian AMI patients could be due to their genetic makeup and nutritional habits involving high consumption of saturated fats. So, we and all these previous studies may infer that high triglycerides, which may be the primary lipid abnormality is a matter of concern in young adults.

## CONCLUSION

This study concluded that there is a high frequency of dyslipidemia in young patients presenting with acute myocardial infarction, with descending order hypertriglyceridemia followed by hypercholesterolemia, raised LDL and low HDL. There is need for life style and dietary modification to control dyslipidemia.

### Conflict of interest:

There is no conflict of interest among all authors.

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