Lipid profile in female patients with Acute Coronary Syndrome at Chitwan Medical College and Teaching Hospital, Nepal.

Sabina Sedhai[1], Shyam Raj Regmi[2], Sudhir Regmi[2], BishnuMani Dhital[2], Keshav Budhathoki[3], Ananda G.C[3], Shahid Murtuza[4], Puran Gurung[4], Amir Khan[4].

Department of Cardiology, Chitwan Medical College and Teaching Hospital, Bharatpur, Nepal

Corresponding Author: Sabina Sedhai

Department of Cardiology

Chitwan Medical College and Teaching Hospital, Bharatpur, Chitwan, Nepal

Email Address: ssedhai10@gmail.com

Abstract:

The study was undertaken to evaluate the lipid profile in female patients with acute coronary syndrome according to age groups, Body Mass Index, and risk factors like hypertension, Diabetes Mellitus, smoking history, previous history of dyslipidemia. This was a prospective observational study from January 2020 to January 2021 conducted in Chitwan Medical College and Teaching Hospital, Bharatpur, Nepal. A total of 38 female patients were included with mean age of 63.68±9.77. This Study demonstrated that age group of 61-70(37%) patients were higher in number with hypertension(63.2%) being the most common risk factor followed by diabetes (52.6%) and smoking history(30.3%). Diagnosis of ST segment elevation myocardial infarction along with high value of lipid profile was observed (14%) than Non-ST segment elevation myocardial infarction (7.1%) and Unstable Angina (7.1%). Risk factors as Diabetes Mellitus and Dyslipidemia were associated with high level of lipid profile in patients with Acute Coronary Syndrome.

Key words: Acute coronary Syndrome, Dyslipidemia, High density Lipoprotein, Low Density Lipoprotein, Total Cholesterol, Triglyceride.

Introduction:

Coronary artery disease is the leading cause of morbidity and mortality around the globe.[1]Several modifiable and non modifiable factors like hypertension, dyslipidemia, diabetes mellitus, physical inactivity, smoking and drinking alcohol habit are major culprit for cardiovascular accident.[2] Disorders in lipid metabolism i.e. dyslipidemia is one of the reason for atherosclerosis and consequent narrowing of vessels considering as a major role for acute coronary syndrome. Dyslipidemia is one the strong modifiable risk factor of coronary artery disease.[3] Assessment of cardiovascular risk can be determined by evaluating lipid profile in terms of total cholesterol (TC), triglycerides (TG), low-density lipoprotein (LDL-C) and high-density lipoprotein (HDL-C). An elevated concentrations of TG, TC, LDL-C and decreased HDL-C accelerate the development of atherosclerotic plaques as evidenced by various studies.[4,5] Females are more susceptible to the various risk factors that have impact on cardiovascular morbidity and mortality but are often misdiagnosed or untreated with a perception that females are low risk population for CVD.[6] This study was aimed to evaluate the frequency of risk factors, and correlation of lipid profile with the risk factors in female patients with acute coronary syndrome.

Methods and Analysis:

A prospective cross sectional descriptive study was conducted on 38 female patients admitted with the diagnosis of acute myocardial infarction, admitted in Coronary Care Unit of Chitwan Medical College and Teaching Hospital, Bharatpur, Chitwan. Informed consent was taken from the patient .History and clinical examinations were done as per pre-structured Performa. The study of total 38 female patients age above 40 were enrolled. The patients with stable coronary artery disease were excluded.

The diagnosis of Acute Myocardial Infarction (AMI) required at least two of following:1). History of prolonged chest pain or discomfort for more than 30 minutes 2) Cardiac biomarkers elevation 3).Presence of new Q waves or new abnormal ST-T changes in ECG. The patients were divided into UA, NSTEMI and STEMI group after taking detailed history, ECG and cardiac biomarkers. The STEMI had following criteria :i) continuous chest pain on presentation lasting more than 30 mins ,ii). ST segment elevation of ≥ 0.2 mv in ≥ 2 contiguous precordial leads, or ≥ 0.1 mV in ≥ 2 contiguous limb leads, or new left bundle branch block on admission in electrogram, iii) presentation within the first 12 hours fom index pain. Patients with NSTEMI

were required to have chest pain lasting more than 30 mins with ST segment depression of more than 0.1 mv in more than 2 consecutive leads upon presentation with elevated cardiac biomarkers, however patients with UA had chest pain more than 5 minutes without ECG changes with normal range of cardiac biomarkers.

Dyslipidemia was define by NCEP ATP III Criteria i.e. any of the following fasting lipid profile values obtained within 24 hours of the event. TC≥200 mg/dl, TG≥ 200mg/dl, LDL ≥ 130 mg/dl and HDL ≤40 mg/dl or patient already on medication for dyslipidemia. For the study, fasting serum lipid profile was sent within 24 hours of admission. 5 ml of blood was withdrawn from the antecubital vein under aseptic technique and was stored in room temperature and later by centrifuge method serum was separated and analyzed the four parameters: Total cholesterol (TC), Triglyceride (TG), High Density Lipoprotein(HDL-C), Low Density Lipoprotein(LDL-C).

Lipid Profile was evaluated with Diagnosis, History of Hypertension, Diabetes Mellitus, Dyslipidemia, Smoking history, BMI. The data were collected and analyzed by using statistical package for social science (SPSS) version 21 software.

Results:

This study was conducted in total 38 female patients who were enrolled during the study period with a mean age of 63.68±9.77. In the study, Figure 1, most of the patients were of the age group 61-70 years 14(37%) while least 1(3%) of age more than 80. From the Figure 2: most of the patients were menopause 31(81.58%). 24(63.2%) female patients had history of hypertension, as hypertension being the most common risk factor for AMI, and secondly 20(52.6%)with history Diabetes mellitus and smoking 12(30.3%)being third risk factor. According to BMI, 24(63.2%) of patients were of normal BMI(less than 25 kg/m^2).

Figure 1: Age group category in female patients with Acute Myocardial Infarction.
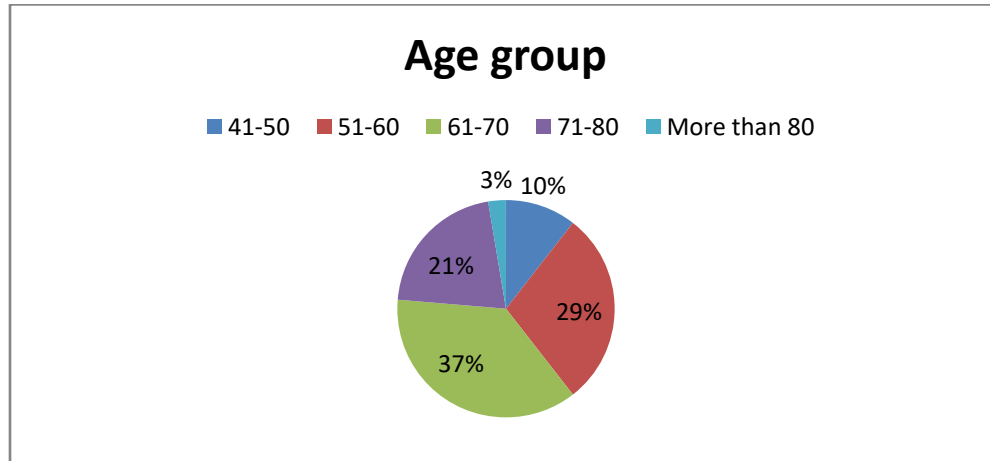

Figure 2: Risk factors in female patients with Acute Myocardial infarction
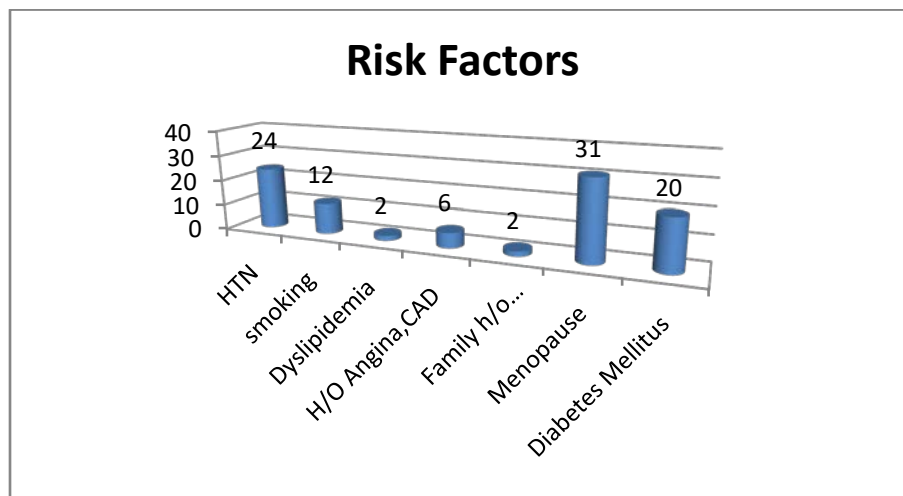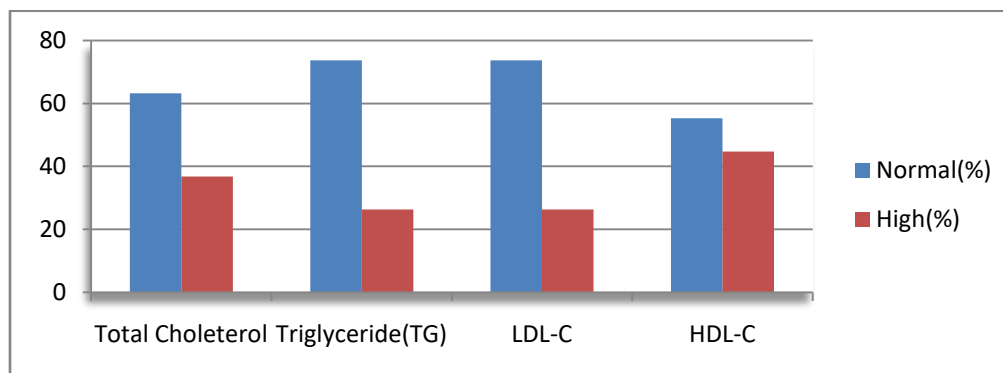

Figure 3: Lipid profile value in female patients with Acute Myocardial infarction

As illustrated in Figure 3, the total cholesterol normal value was in 63.25% and high in 36.8%. Triglyceride normal value in 73.7% and high in 26.3%. Similarly, LDL and HDL normal value in 73.7% (LDL) and 55.3% (HDL) with high value in 26.3 %(LDL) and 44. 7% (HDL) respectively. Out of 38 Patients, 28 patients (73.7%) were diagnosed with STEMI whereas 6(15.8%) with USA and 4(10.5%) with NSTEMI.

Table 1: Comparison of normal and high value of lipid profile according to Diagnosis, Risk factors, BMI.

	LP Profile		x^2 value	P-value
	Normal value	**High value**		
Diagnosis			**0.525**	**0.769**
USA	3 (21.4%)	1 (7.1%)		
NSTEMI	1 (7.1%)	1 (7.1%)		
STEMI	6 (42.9%)	2 (14.3%)		
Risk Factor:Hypertension			**0.562**	**0.453**
Yes	6 (58.8%)	2 (11.8%)		
No	8 (47.1%)	1 (5.9%)		
Risk factor: Dyslipidemia			**0.152**	**1.000***
Yes	1 (6.3%)	0(0.0%)		
No	13(81.3%)	2 (12.5%)		
Risk factor : Smoking			**1.154**	**0.283**
Yes	5 (33.3%)	0 (0.0%)		
No	8 (53.3%)	2 (13.3%)		
Risk factor: Diabetes Mellitus			**0.228**	**1.000***
Yes	1 (5.9%)	0 (0.0%)		
No	13 (76.5%)	3 (17.6%)		
BMI group			**1.570**	**0.515**
Normal Weight	10(58.8%)	1 (5.9%)		
OverWeight	4 (23.5%)	2 (11.8%)		

* fisher's Exact test

Discussion:

Atherosclerosis is one of the major causes of myocardial infarction. Risk factors for the development of atherosclerosis are age, gender, hypertension, diabetes, dyslipidemia, smoking [7]This study focused on the effect of those risk factors only in female patients with acute myocardial infarction. According to the study of Redfors et al.[8], acute myocardial infarction among women was commonly affected by multiple risk factors. Women more commonly have diabetes and arterial hypertension, while cigarette smoking was the least risk factors. But in our study, Hypertension (63.2%) being the most common risk factor followed by diabetes and smoking. Dyslipidemia is the major risk factor for coronary artery disease and high level of total cholesterol, TG, LDL-C and low level of HDL-C are conventional risk factors for myocardial infarction.[9] However, in our study, high total cholesterol was observed only in 36.8%, and high

TG and LDL-C in 26.3%. Study done by Gorecki et al [10] observed high levels of total cholesterol and LDL during the first 24 hours of AMI and these parameters have a strong negative prognostic value. In a study done by Rachana et al.[11], high levels of TG and low levels of HDL cholesterol were the most prominent lipid abnormalities in chronic diabetic patients with AMI. However in a study conducted by Kheraj Mal et al, [12] total cholesterol and LDL were higher in patients with acute myocardial infarction and no difference in TG levels in patients with or without myocardial infarction. Study carried out in Malaysia by Haque ATME et al.[13] most of the patients with coronary heart disease had high total cholesterol level range with normal TG range and Malays were affected more followed by Chinese and Indians. Phasic fluctuations in lipid profile results were observed in a study done by Kumar et al.[14] where level of total cholesterol and LDL were measure within 24 hours and after 48 hours of acute myocardial infarction.

Despite considering dyslipidemia as major risk factors, limited studies were carried out in few numbers of patients with acute coronary syndrome. The study was conducted in a single center during the COVID pandemic and the result cannot be generalized to the entire population. Patient outcomes were not noted.

In conclusion, females of age 61-70 years of age are more likely to have acute coronary syndromes where hypertension being the most common risk factor followed by Diabetes mellitus. The study showed that most females were presented with acute STEMI and high value of lipid profile was correlated with history of dyslipidemia and diabetes mellitus.

References:

1. Khan MA, Hashim MJ, Mustafa H, et al. Global Epidemiology of Ischemic Heart Disease: Results from the Global Burden of Disease Study. *Cureus*. 2020;12(7):e9349. Published 2020 Jul 23. doi:10.7759/cureus.9349

2. V Achari, Artav Thakur, Association of major modifiable risk factors among patients with coronary artery disease - A retrospective analysis, The Journal of the Association of Physicians of India, March 2004, 52:103-8.

3. Zhixiong Zhong, Jing Liu, Bing Li et al., Serum lipid profiles in patients with acute myocardial infarction in Hakka population in southern China, Lipids in Health and Disease (2017) 16:246, DOI 10.1186/s12944-017-0636-x.

4. Yong W, Qi B, Xu J, Zhou G, Chen S, Ping O, Liu S. Age- and sex-related difference in lipid profiles of patients hospitalized with acute myocardial infarction in East China J Clin Lipidol. 2014;8:562–7.

5. Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, Mcqueen M, Budaj A, Pais P, Varigos J. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. Orv Hetil. 2006;147:675.

6. Christina Chrysohoou, Constantina Aggeli et al, Cardiovascular disease in women: Executive summary of the expertpanel statement of women in cardiology of the hellenic cardiological society, Hellenic Journal of cardiology 61(2020) 362-377.

7. Azab AE, Elsayed ASI (2017) Acute Myocardial Infarction Risk Factors and Correlation of its Markers with Serum Lipids. J Appl Biotechnol Bioeng 3(4): 00075. DOI: 10.15406/jabb.2017.03.00075.

8. Redfors B, Angeras O, Ramunddal T, Petursson P, Haraldsson I, et al. (2015) Trends in Gender Differences in Cardiac Care and Outcome After Acute Myocardial Infarction in Western Sweden: A Report From the Swedish Web System for Enhancement of Evidence- Based Care in Heart Disease Evaluated According to Recommended Therapies (SWEDEHEART). J Am Heart Assoc 4(7): e001995.

9. Adak M and Shivapuri JN. Serum lipid and lipoprotein profile abnormality in predicting the risk of coronary artery disease in non-diabetic patients attending NMCTH, Birgunj. Nepal Med Coll J 2010;12(3):158-64.

10. Gorecki A, Bednarz B, Jaxa-Chamiec T, et al. Lipid profile during the first 24 hours after myocardial infarction has significant prognostic value. Kardiol Pol 2004;60:229-36.

11. Rachna Sabharwal, Lakhbir Singh, A.S. Bhatia, Dyslipidemia in Diabetic Patients with Acute Myocardial Infarctiion, www.jkscience.org Vol. 21 No. 4, October.-Dec 2019:160-164.

12. Mal K, Kumar R, Ejaz M, et al. (December 25, 2019) Comparison of Lipid Profile in Patients With and Without Acute Myocardial Infarction. Cureus 11(12): e6467. DOI 10.7759/cureus.6467

13. Haque ATME, Yusoff FBM, Ariffin MHS, Hamid MF, Hashim SRB, Haque M. Lipid Profile of the Coronary Heart Disease (CHD) Patients Admitted in a Hospital in Malaysia. J App Pharm Sci, 2016; 6 (05): 137-142

14. Kumar N, Kumar S, Kumar A, et al. (March 18, 2019) Lipid Profile of Patients with Acute Myocardial Infarction (AMI). Cureus 11(3): e4265. DOI 10.7759/cureus.4265