JMSCR Vol||05||Issue||01||Page 15499-15507||January 2017

www.jmscr.igmpublication.org
Impact Factor 5.84
Index Copernicus Value: 83.27
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v5i1.50

IGM Publication Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

A Clinical Study of Risk Factors of Coronary Artery Disease including newer Risk Factors in Elderly Patients

Authors
Dr Shikhar Bajpai[1], Dr Sucheeth Avanti[2], Dr T. K. Biswas[3], Dr Digvijay Shinde[4]
[1,2]Resident (Geriatrics), [3]Professor & HOD (Geriatrics), [4]Lecturer (Dept. of Medicine)
MGM Medical College and Hospital, Kamothe, Navi Mumbai

Introduction

Coronary artery disease (CAD) is the result of the accumulation of atheromatous plaques within the walls of the coronary arteries. CAD is one of the most common cause of morbidity and mortality in different communities. WHO has predicted that by 2020 up to three quarters of death in developing countries would result from non-communicable diseases and CAD will top the list of killers. Patients with ischeamic heart disease fall into two large groups: patients with chronic coronary artery disease who most commonly present with stable angina and patients with acute coronary syndromes. Despite advances in diagnosis and management, STEMI continues to be a major public health problem in the industrialized world and is rising in developing countries. The rate for MI rises for both men and women sharply with increasing age, and racial differences exist. It seems likely that changing lifestyles such as high consumption of processed foods rich in saturated fat and a low level of physical activity along with the rising prevalence of obesity and type 2 Diabetes are leading to a progressive increase in the prevalence cardiovascular disease in developing countries. This study will help to find out more about risk factors of the CAD in elder patients.

Materials and Method

Present study comprises randomly selected patients having coronary artery disease. Total 33 patients having electrocardiographic evidence of coronary artery disease were included during the period of 1st May 2015 to 31st August 2016.

Inclusion Criteria

- Age 60 and above
- Having CAD

Exclusion Criteria

- Age less than 60

Coronary artery disease is defined in the presence of minimum 2 of the following-

1. Chest pain suggestive of cardiac origin
2. Creatine kinase – MB, atleast four times, the upper limit of lab range.
3. ECG changes, consists of >/= 1 of the following;

1) ST segment elevation of >/= 2 mm from J point in 2 related electric fields with typical evolutionary changes

2) Presence of new pathologic Q waves in 2 related electric fields[for Q - MI]

Non Q – MI are included in this study with ST depression and T inversion plus elevation in cardiac enzymes and typical chest pain.

Participants were interviewed by using standard questionnaires to obtain information on demographic data, occupation, smoking history, history of diabetes mellitus, history of hypertension and family history of CVDs in first degree relatives. Clinical data collected includes age, sex, traditional risk factors, height, weight, body mass index, waist circumference, hip circumference, waist to hip ratio, pulse, systolic and diastolic blood pressures. Each patient was investigated for fasting and post – prandial blood sugar level, lipid profile, CRP, homocysteine level, Carotid artery intimal thickness and fatty liver.

1. The height of patient was measured in meters and weight in kilograms.
2. BMI was calculated as per following formula;

BMI= Weight(Kg)/Height^2 (Meters)

Classification of BMI given by WHO

S.No.	Category	BMI(Kg/m^2)
1	underweight	<18.5
2	Normal Weight	18.5 – 24.9
3	Overweight	25 – 29.9
4	Obesity class-1	30 – 34.9
5	Obesity class-2	35 – 39.9
6	Obesity class-3	>40

Waist circumference was measured in a standing position at the level of iliac crest with help of non – stretchable tape.

Weight measured with standard calibrated weighing machines

3. Physical activity was measured by asking about both work – related and leisure time activities as per criteria defined by Paffenberger et al.
4. BP was measured in supine position with manual sphygmomanometer. At least two readings at 5 minutes interval were recorded.
5. All types of tobacco products users, present and past smokers were included in smoker category.
6. 5 ml of blood was collected from each subject after fasting more than 8 hours. The serum was used to measure glucose levels and lipid markers, including total cholesterol, triglycerides, high density lipoprotein,LDL, CRP and homocysteine within 2 hours after blood collection
7. ATP III classification of Total Cholesterol

<200	Desirable
200 – 239	Borderline High
>/= 240	High

8. ATP III classification of LDL cholesterol

<100	Optimal
100 – 129	Near Optimal
130 - 159	Borderline High
160 - 189	High
>/= 190	Very High

9. ATP III classification of TG

Triglyceride Category	ATP II Levels	ATP III Levels
Normal TG	<200 mg/dl	<150 mg/dl
Borderline High TG	200 – 399 mg/dl	150 – 199 mg/dl
High TG	400 – 1000 mg/dl	200 – 499 mg/dl
Very High TG	>1000 mg/dl	>/=500 mg/dl

10. Homocysteine level more than 10.8 is labelled as positive.
11. As per ADA Guidelines the revised criteria of Diabetes Mallitus includes:

a) Symptoms of diabetes and casual plasma glucose >/=200 mg/dl

b) FBS >/=126 mg/dl or 2 hour PPBS >/= 200 mg/dl during an OGTT

12. Each patient was screened for Carotid artery intima thickness and fatty liver on GE logic P5 by trained radiologist

a) Carotid artery intima thickness was diagnosed with linear probe if intima thickness found to be more than 1mm or evidence of plaque.

b) For fatty liver abdomen was screened with convex probe and grouped in three classes:

Mild	Minimal diffuse increase in hepatic echogenicity; Normal visualisation of diaphragm and intrahepatic vessels borders
Moderate	Moderate diffuse increase in hepatic echogenicity; Slightly impaired visualisation of intrahepatic vessels borders and diaphragm
Severe	Marked increase in hepatic echogenicity; Poor penetration of the posterior segment of right lobe of liver and poor or nonvisualisation of intrahepatic vessels borders and diaphragm

Aim and Objective

Aim

1. To compile clinical data of coronary artery disease in elders.
2. To study risk factors of coronary artery disease in elders.
3. To correlate novel risk factors with conventional risk factors of coronary artery disease in elders.

Objective

The objective is to prevent morbidity and mortality of coronary artery disease by early detection and preventive measures.

Result and Observations

Table - 1

AGE WISE DISTRUBATION		
AGE	FREQUENCY	PERCENTAGE
60-65	22	66.66%
66-70	5	15.15%
71-75	2	6.06%
76-80	4	12.12%
Total	33	100%

In total 33 patients, 22(66.66%) patients were in the range of 60-65 years, 5(15.15%) were in 66-70 years range, 4(12.12%) were in 76-80 years range and 2(6.06%) were between 71-75 years.

Fig. 1

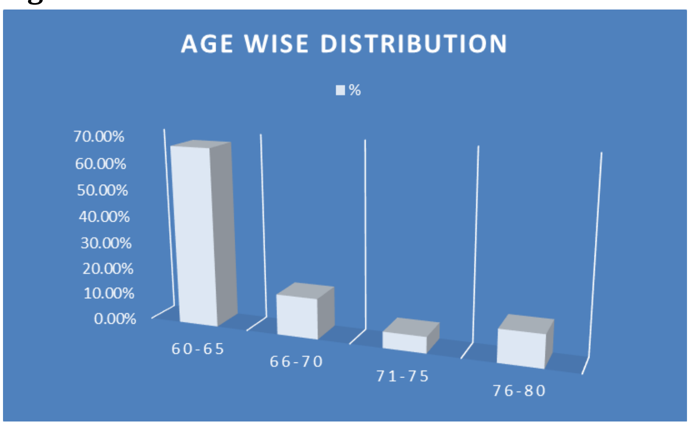


Table - 2

SEX WISE DISTRIBUTION		
Sex	Frequency	Percentage
Male	25	75.75%
Female	8	24.24%
Total	33	100%

In total 33 patients who enrolled in the study, most of them was male i.e. 25(75.75%) and 8 (24.24%) were female.

Fig. 2

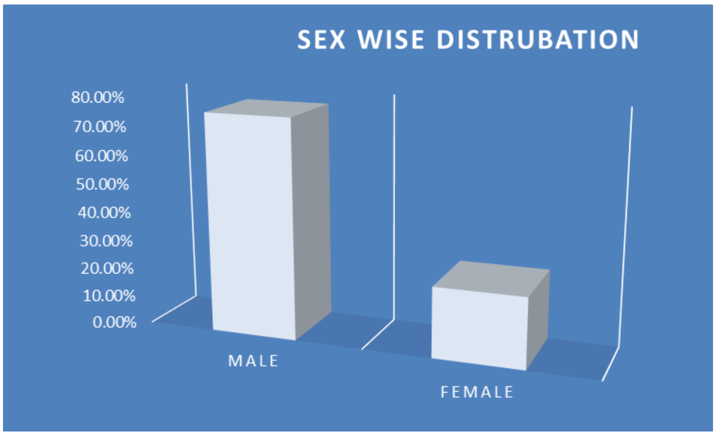


Table - 3

PHYSICAL ACTIVITY		
Physical activity	Frequency	Percentage
Sedentary	20	60.60%
Active	13	39.39%
Total	33	100%

In 33 elderly patients, 20 (60.60%) patients were sedentary and only 13(39.39%) patients were active in their physical activity.

Fig. 3

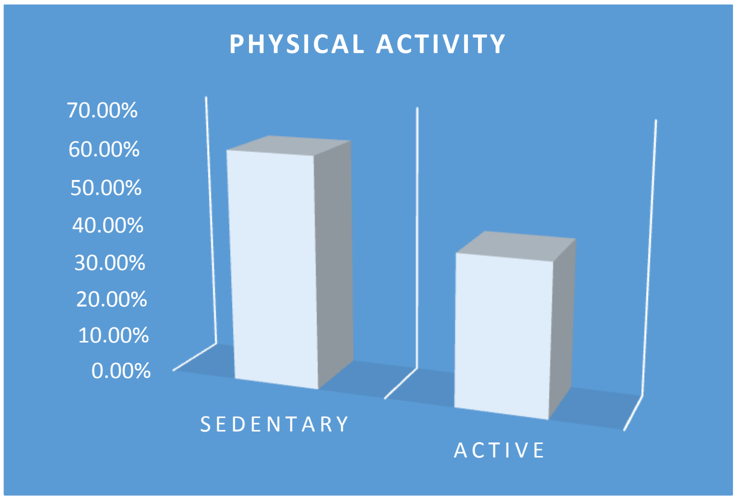


Table - 4

FAMILY HISTORY OF CVD		
Present	12.12%	4
Absent	87.87%	29
Total	100%	33

In total 33 patients, there was no family history of cardiovascular disease in 29(87.87%) patients while only in 4 (12.12%) patients history of cardiovascular disease was there.

Fig. 4

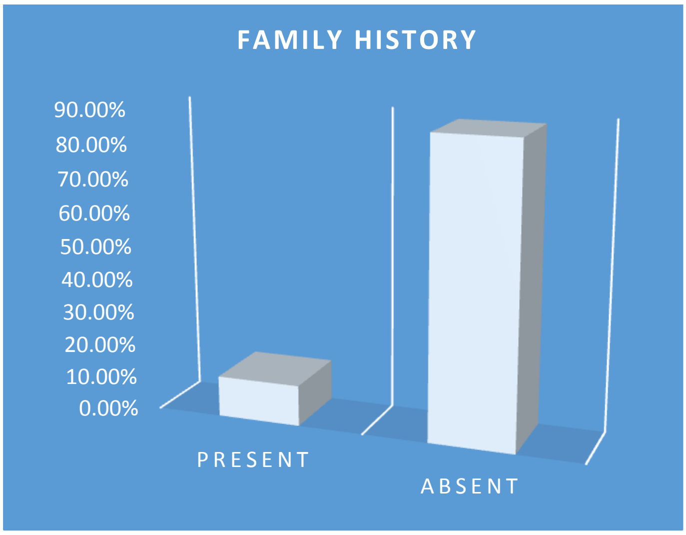


Table - 5

SMOKING HISTORY		
Present	57.57%	19
Absent	42.42%	14
Total	100%	33

In total 33 patients enrolled in the study, 19(57.57%) patients had the history of smoking while in 14 (42.42%) patients, there was no history of smoking.

Fig. 5

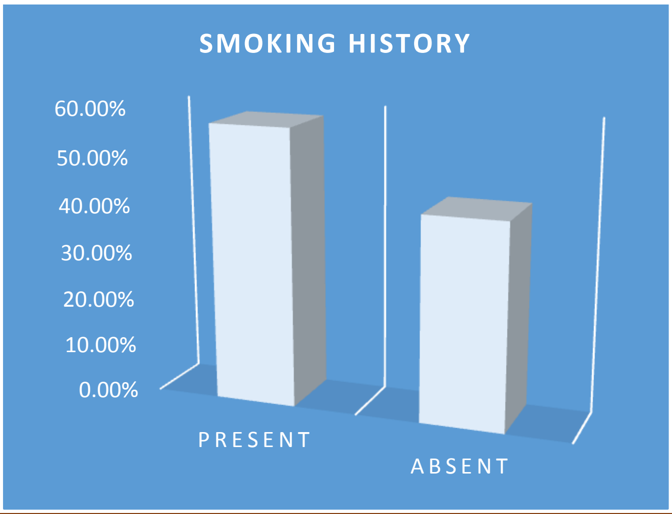


Table - 6

HYPERTENSION		
Present	42.42%	14
Absent	57.57%	19
Total	100%	33

In total 33 patients, 19(57.57%) patients were hypertensive and 14(42.42%) patients did not have any hypertension.

Fig. 6

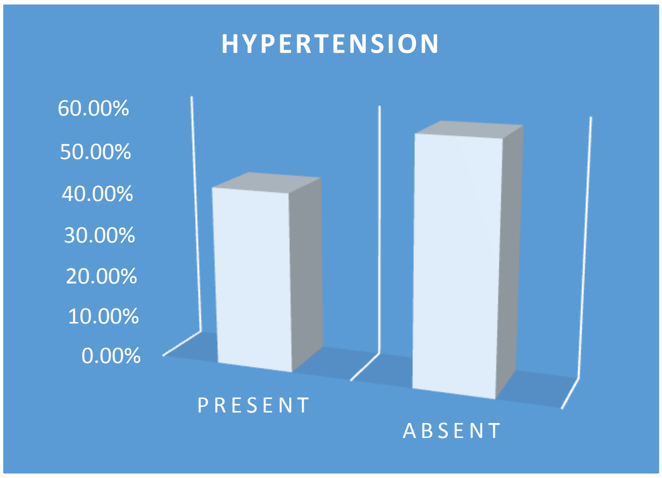


Table - 7

DIABETES MALLITUS		
Present	33.33%	11
Absent	66.66%	22
Total	100%	33

In total 33 patients, 22(66.66%) patients were not diabetic and 11(33.33%) patients were diabetic.

Fig. 7

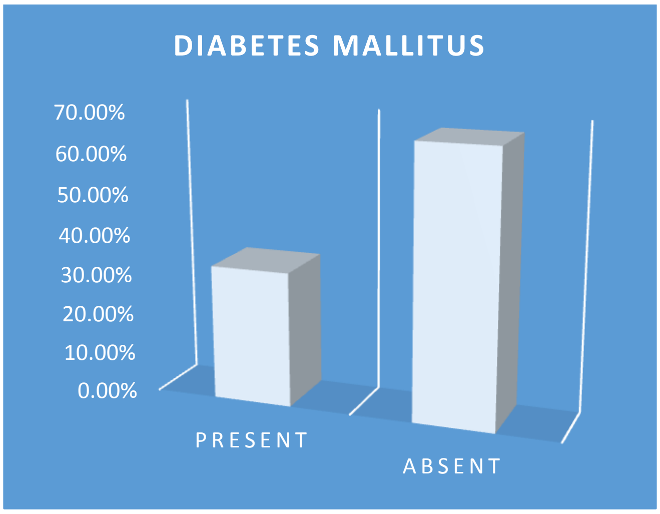


Table - 8

BODY MASS INDEX		
18.5 - 25	39.39%	13
25 - 30	42.42%	14
30 - 35	18.18%	6
Total	100%	33

In total 33 patients, 14(42.42%) patients were overweight, 13(39.39%) patients were normal and 6 (18.18%) patients were obese according to their body mass index.

Fig. 8

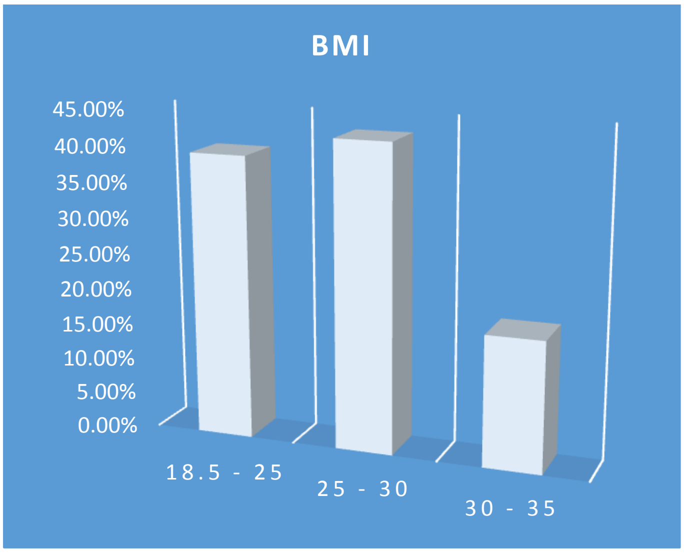


Table - 9

CHOLESTEROL		
<200	15.15%	5
200-239	27.27%	9
>240	57.57%	19
Total	100%	33

In total 33 elderly patients, 19(57.57%) patients had total cholesterol more than 240 mg/dl, 9 (27.27%) patients had total cholesterol in the range of 200-239 mg/dl and 5(15.15%) patients had total cholesterol below 200 mg/dl.

Fig. 9

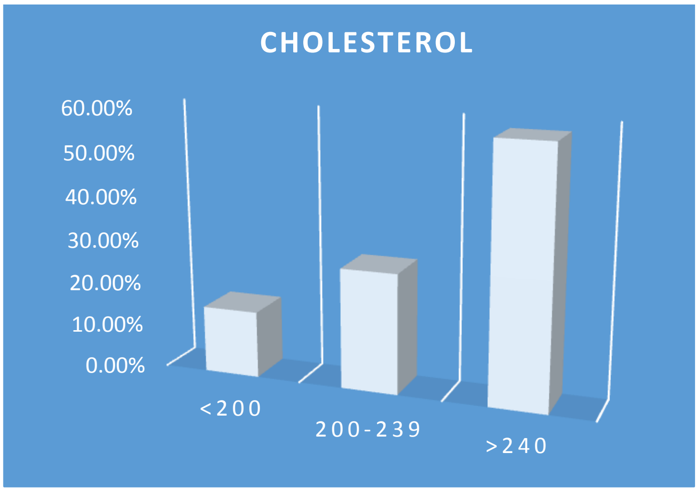


Table - 10

LDL		
<100	6.06%	2
100-129	18.18%	6
130-159	39.39%	13
160-189	27.27%	9
>190	9.09%	3
Total	100%	33

In total 33 patients, 13(39.39%) patients had LDL level in the range of 130-159 mg/dl, 9(27.27%) patients had LDL level in the range of 160-189 mg/dl, 6 (18.18%) patients had LDL level between 100-129 mg/dl, 3 (9.09%) patients had LDL more than 190 mg/dl while 2(6.06%) patients had LDL levels below 100 mg/dl.

Fig. 10

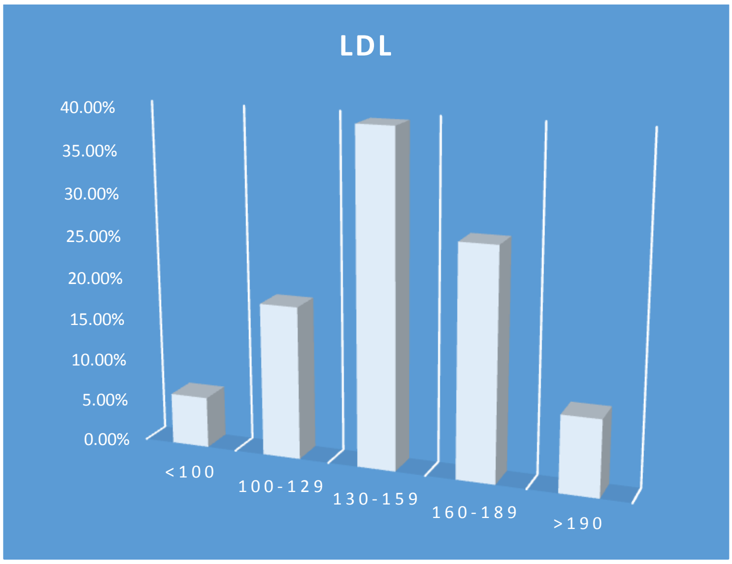


Table - 11

TRIGLYCERIDES		
<150	6.06%	2
150-200	15.15%	5
200-499	78.78%	26
>500	0%	0
Total	100%	33

In total 33 patients, 26(78.78%) patients had triglycerides between 200 – 499 mg/dl, 5(15.15%) patients had triglyceride level between 150 – 200 mg/dl while only 2(6.06%) patients had triglyceride level below 150 mg/dl.

Fig. 11

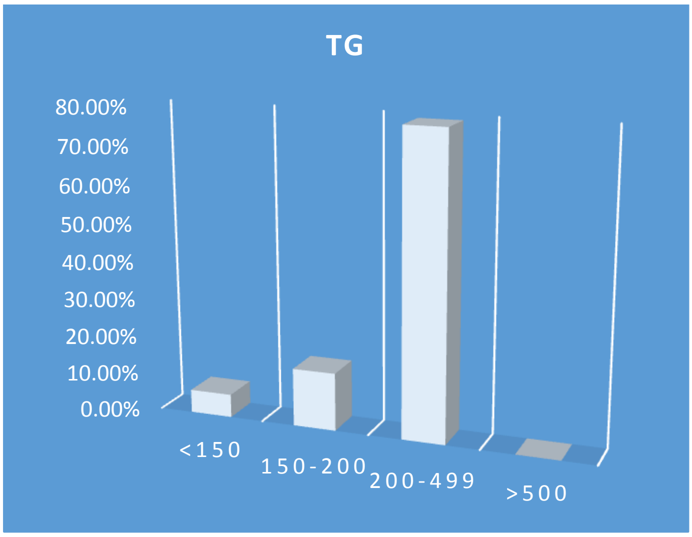


Table - 12

C – REACTIVE PROTIEN		
Absent	57.57%	19
Present	42.42%	14
Total	100%	33

In total 33 patients, 19(57.57%) patients had normal C – Reactive Protein levels and 14 (42.42%) patients C – Reactive Protein levels are raised.

Fig. 12

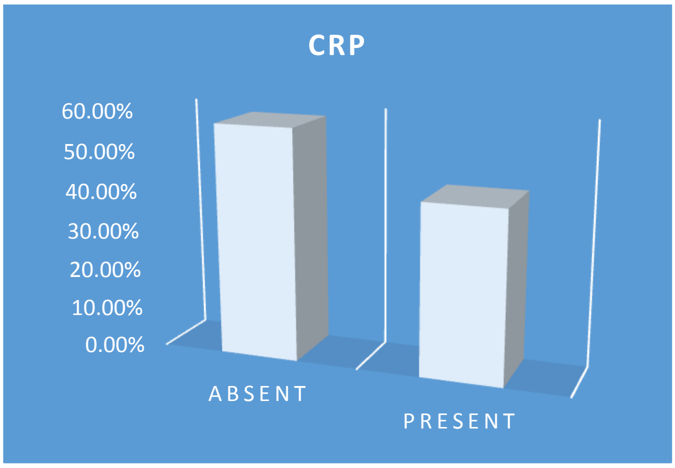


Table - 13

HOMOCYSTEINE		
Normal	51.51%	17
Abnormal	48.48%	16
Total	100%	33

In total 33 patients of our study, 17(51.51%) patients had raised homocysteine levels while 16 (48.48%) patients' homocysteine was within normal limits.

Fig. 13

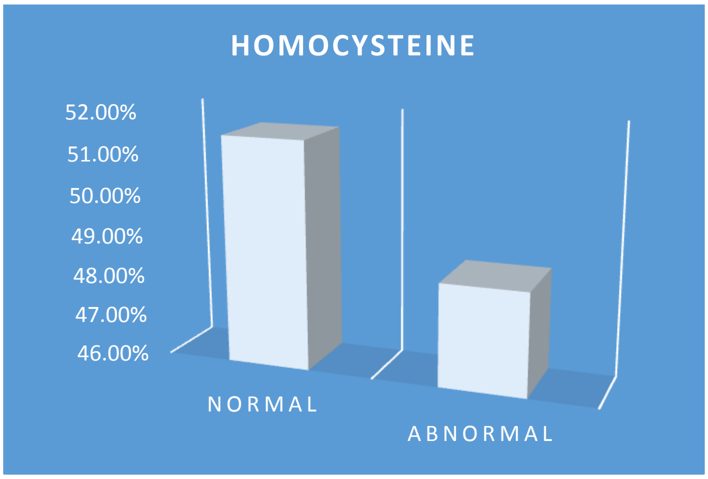


Table - 14

FATTY LIVER		
Present	54.54%	18
Absent	39.39%	13
Total	100%	33

In total 33 patients of our study, 18(54.54%) patients had fatty liver on sonographic assessment and 13(39.4%) patients did not have any evidence of fatty liver.

Fig. 14

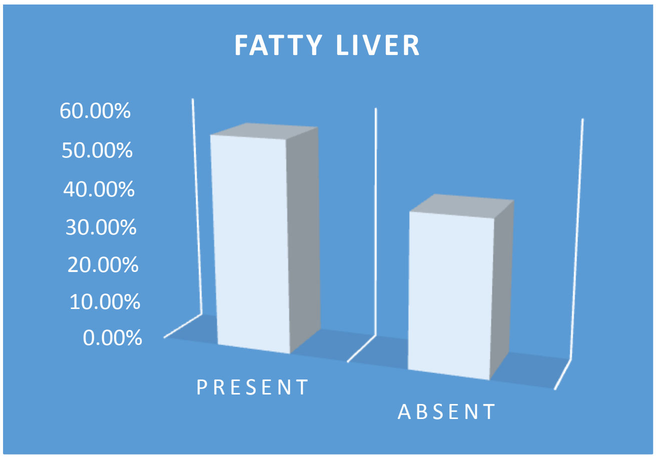


Table - 15

FATTY LIVER GRADES		
I	50%	9
II	38.89%	7
III	11.11%	2
Total	100%	18

There was overall 18 patients who had fatty liver on sonographic assessment. In these 9 (50%) patients had grade I fatty liver, 7 (38.89%) patients had grade II fatty liver and 2(11.11%) patients had grade III fatty liver.

Fig. 15

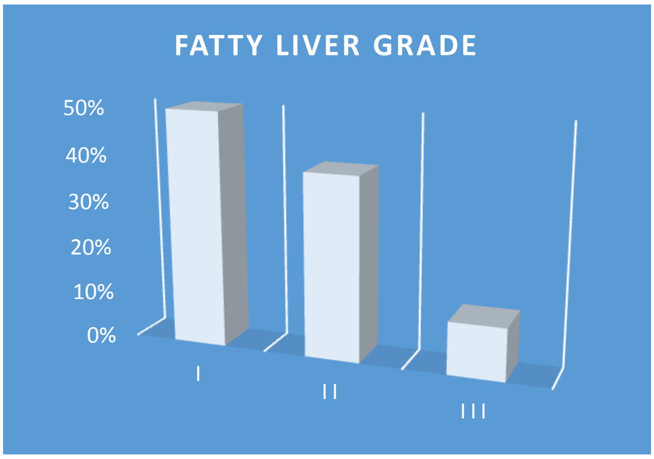


Table - 16

CAROTID INTIMA THICKNESS		
Present	54.54%	18
Absent	45.45%	15
Total	100%	33

In total 33 patients, there were 18(54.54%) patients in which carotid intimal thickness was present.

Fig. 16

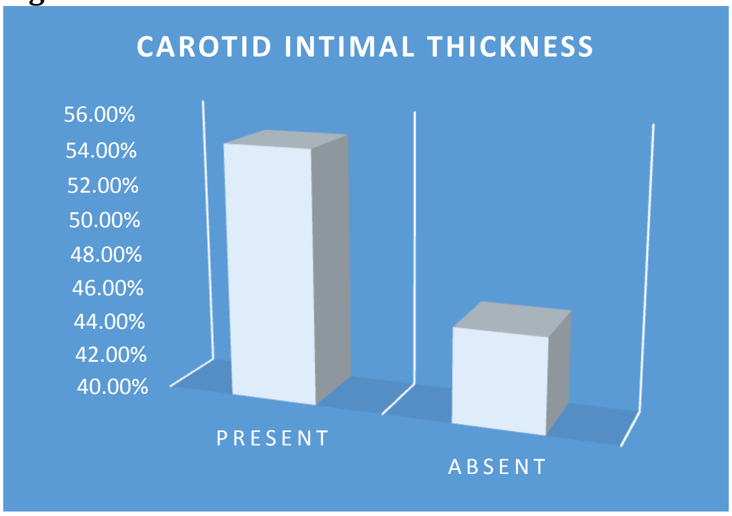


Table - 17

CAROTID INTIMA THICKNESS WITH LDL		
High	83.33%	15
Normal	16.67%	3
Total	100%	18

There was 18 patients of carotid intima thickness, in which 15 (83.33%) patients had high LDL cholesterol and 3 (16.67%) patients' LDL were within normal limits.

Fig. 18

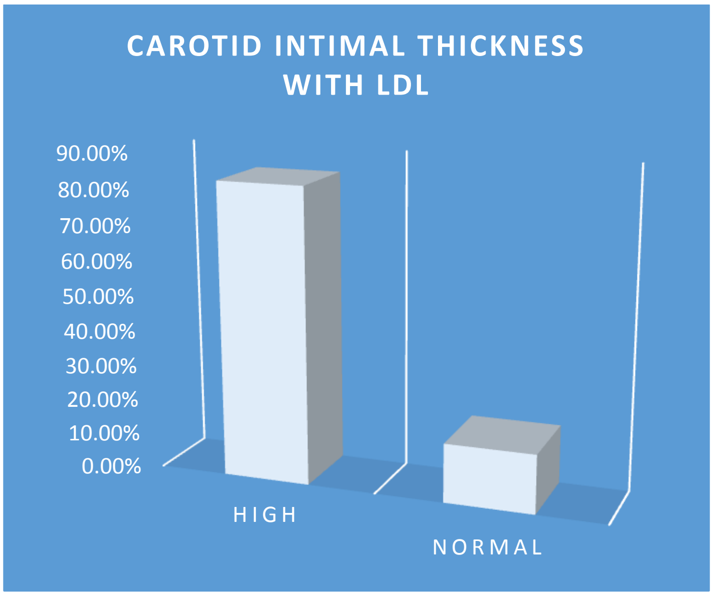


Table - 19

CAROTID INTIMA THICKNESS WITH FATTY LIVER		
Present	66.67%	12
Absent	18.18%	6
Total	100%	18

There was 12(66.67%) patients who had carotid intima thickness showed fatty liver also and 6(18.18%) patients did not have the same.

Fig. 19

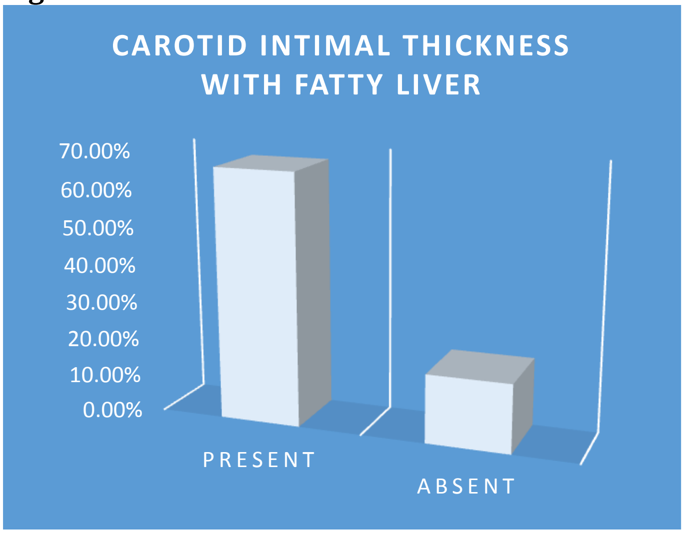
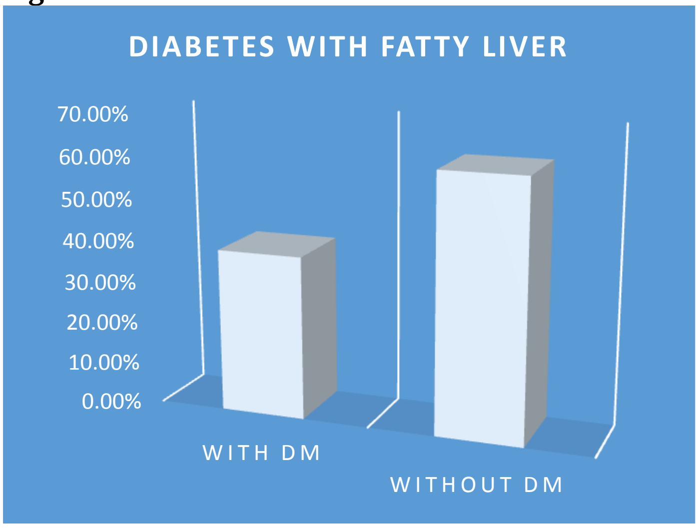


Table - 20

DIABETES MALLITUS WITH FATTY LIVER		
With DM	38.89%	7
Without DM	61.11%	11
Total	100%	18

In our study, there are 7(38.89%) patients of fatty liver who also had diabetes mellitus and 11(61.11%) was without diabetes.

Fig. 20



Discussion and Conclusion

- In our study mean age of the patient is 65.5 years with the range of 60-80 years.
- In Jayachandra, et al. study mean age of patients enrolled in the study was about 40.5 ± 4.1 for younger group and 56.4 ± 6 for elderly patients
- Previous studies have shown that the male gender is one of the classic risk factors for CAD.This study also concur with previous findings that overall risk factors were more likely in males when compared to females.
- Our study showed that smoking is a major risk factor for CAD in elderly patients i.e. 57.57% were smoker. The effect of cigarette smoking on coronary risk factors is pervasive. Unfavourable effects include enhancement of platelet function. Platelet activation by cigarette smoking is linked to thrombosis formation, including onset of myocardial infarction. This concur with the Jayachandra, et al. study also.
- High prevalence of hypertension was seen among the elderly patients. But in our study, only 42.4% patients were hypertensive and 57.7% were non hypertensive. This disagrees with the previous studies by Sofia and EUROSPIRE, Jayachandra, et al. in which hypertension has been seen as a major risk factor for CAD.
- Hyperinsulinemia, insulin resistance, and the higher rate of prevalence of metabolic syndrome in people with type-2 diabetes were attributed to high coronary risk in south Asians.
- In this study, the fasting lipid profile tests revealed evidence of dyslipidaemia in 84.9% elderly subjects. The importance of dyslipidaemia in the pathogenesis of CAD is well-known. In a study conducted by Mohan *et al.*, between 1998 and 2002 on a North Indian population showed that CAD occurred at much lower levels of total cholesterol and LDL-C than other populations, and high triglyceride and low HDL levels were of a universal phenomenon in this population.
- In view of obesity as the risk factor for CAD, based on the BMI, 18.18% of the elderly had a BMI higher than 30, whereas 42.4% elderly were overweight. Although most of the co-morbidities relating obesity to CAD increase as BMI increases, they also relate to body fat distribution. It might

indicate that obesity as such not only relates to but independently predicts coronary atherosclerosis.

- In total 33 patients of our study, 19 (57.57%) patients had normal C – Reactive Protein levels and 14(42.42%) patients C – Reactive Protein levels are raised. Which shows that C- reactive protein has no significance in CAD in elderly.
- 17(51.51%) patients had raised homocysteine levels while 16 (48.48%) patients' homocysteine was within normal limits in our study which shows that homocysteine levels can be a risk factor for CAD in elderly population.
- There was overall 18 (54.54%) patients who had fatty liver on sonographic assessment. In these 9 (50%) patients had grade I fatty liver, 7 (38.89%) patients had grade II fatty liver and 2(11.11%) patients had grade III fatty liver. This signifies that fatty liver is associated with the increase risk of coronary artery disease. In our study, there are 7(38.89%) patients of fatty liver who also had diabetes mellitus
- There were 18(54.54%) patients in which carotid intimal thickness was present and significant and makes it an important risk factor for the coronary artery disease. In these 18 patients, 15 (83.33%) patients had high LDL level also. There was 12(66.67%) patients who had carotid intima thickness with fatty liver.
- This study was confined to a small population of Navi Mumbai and had several limitations. Therefore, it is imperative to undertake large population-based, prospective studies in developing countries such as India to identify CAD-risk factors, both conventional and novel.
- This preliminary study throw significant light on the causative factors like smoking, hypertension, diabetes, dyslipidemia and some new factors like homocysteine, C-reactive protein, fatty liver and carotid intimal thickness for CAD from Navi Mumbai and thus pave the way for prevention of this silent killer.

Bibliography

1. Jaychandra et al Risk-Factor Profile for Coronary Artery Disease among Young and Elderly Patients in Andhra Pradesh Heart India, Vol 2 / Issue 1/ Jan-Mar 2014
2. Kasliwal RR, Kulshreshtha A, Agrawal S, Bansal M, Trehan N. Prevalence of cardiovascular risk factors in Indian patients undergoing coronary artery bypass surgery. J Assoc Physicians India 2006;54:371-5.
3. Gupta R. Meta-analysis of hypertension in India. Indian Heart J 1997;49:43-8.
4. Von Eyben FE, Bech J, Madsen J, Efsen F. High prevalence of smoking in young patients with acute myocardial infarction. J R Soc Health 1996;116:153-6.
5. Jörgensen S, Köber L, Ottesen M, Torp-Pedersen C, Videbaek J, Kjøller E. The prognostic importance of smoking status at the time of acute myocardial infarction in 6676 patients. J Cardiovasc Risk 1999;6:23-7.
6. . Pfeffer M, McMurray J, Leizorovicz A, Maggioni AP, Rouleau JL, Van De Werf F, *et al.* VALIANT investigators. Valsartan in acute myocardial infarction trial (VALIANT): Rationale and design. Am Heart J 2000;140:727-50.
7. Shepard J, Blauw GJ, Murphy MB, Bollen EL, Buckley BM, Cobbe SM, *et al*. Pravastatin in elderly individuals at risk of vascular disease (PROSPER): A randomized controlled trial. Lancet 2002;360:1623-30.
8. Beg MA, Siddique MKJ, Abbasi AS, Ahmad N. Atherosclerosis in Karachi . J Pak Med Assoc 1967;17:236-40
9. Khan N. Epidemiology of coronary heart disease in Peshawar. Pakistan Heart J 1973;6:64-9.