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Study of Conventional Risk Factors in Patients With Acute Myocardial Infarction

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Abstract:
Objective: *To study the profile of various conventional risk factors in men and women with acute myocardial infarction amongst rural population of Jharkhand so that the modifiable risk factors are identified and treated to prevent future coronary events in patients with acute myocardial infarction. To increase awareness about CAD, its consequences and modifiable risk factors among rural population of Jharkhand.*
Materials and Methods*: It is a hospital based observational study. On admission detailed history was taken and a complete examination was done. ECG was done at the time of admission and was repeated if necessary. The serum cardiac enzyme levels were measured at the time of admission and at 6hrs after admission for diagnosis of MI. In history special attention was paid to previous history of chest pain, smoking, diabetes mellitus, hypertension, physical activity, alcohol consumption and family history. Routine investigations such as blood examination for Hb% (Sahli's method). WBC counts, ESR (Westergren's method) were done. Urine was tested for sugar (using Benedict's solution) protein by (heat and acetic acid test) and microscopic examination. The data obtained was analyzed by descriptive statistics by means of percentage, proportions, mean*
Results: *Commonly associated modifiable coronary risk factors in this study are, decreased HDL- cholesterol (54%), smoking (51%), sedentary physical activity (40%), hypertriglyceridemia (40%), diabetes mellitus (38%), hypertension (30%), increased LDL-cholesterol (24%) and obesity (9%). 7% of the patients in this study did not have any of the known conventional risk factors*.
Conclusion: *This study concludes that above conventional risk factors play a major role in genesis of coronary heart disease. Modification of these factors by pharmacotherapy, diet, exercise, and behavioral therapy can improve the prognosis and reduce the mortality significantly along with bringing down the incidence of CHD in general population*
Key Word*: Myocardial Infarction; Diabetes Mellitus; Dyslipidemia; Hypertension; Obesity*

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I. Introduction

Over the last decades coronary vascular disease (CVD) has become the single largest cause of death worldwide. In 2004, CVD caused an estimated 17 million deaths and led to 151 million disability-adjusted life years (DALY's) lost that year[1]. India is experiencing an alarming increase in heart disease. In 1960, CVD represented 4% of all CVD deaths in India, whereas in 1990 proportion was >50%. CVD accounts for 46% of non-communicable deaths and is a leading cause of death among adults >35 years[2]. This transition appears to be due to increasing western lifestyle. It has been suggested that Indians have exaggerated insulin insensitivity in response to western lifestyle patterns, leading to hyperlipidemia which in turn leads to increased rates of CVD. Worldwide high cholesterol levels are estimated to cause 56% of ischemic heart disease. As countries move through the epidemiologic transition, mean population plasma cholesterol levels tend to rise. Greater urbanization is associated with higher cholesterol levels due to greater consumption of dietary fats, primarily from animal products and processed vegetable oils and decreased physical activity. CVD has a wide range of presentation ranging from stable angina, unstable angina, myocardial infarction to sudden death. Myocardial infarction (MI) occurs due to ischemic necrosis of myocardium. Observation indicates that lipid metabolism abnormality plays a major role in the pathogenesis of CVD. Blood lipid abnormality along with cigarette smoking, hypertension, diabetes mellitus, obesity, lack of physical activity, metabolic syndromes are major modifiable risk factor for coronary artery disease (CAD).

II. Material And Methods

Study Design: Hospital based observational study
Study Location: The rural patients admitted for acute myocardial infarction under the department of General Medicine, RIMS Ranchi
Study Duration: January 2021 to January 2022
Sample size: 100 patients.
Subjects & selection method: Selection of patients: The study was conducted on 100 rural patients fulfilling the inclusion criteria admitted with acute myocardial infarction in ICCU under medicine department from January 2021 to January 2022

Inclusion criteria:
Patients with the evidence of acute MI according to WHO criteria were included in the study. The diagnosis of acute MI was established if any 2 of the parameters assessed were present-

1. Typical history of chest pain persisting for > 30 min
2. Classical ECG changes indicating ACUTE MI.
3. Elevated cardiac enzyme levels.

Exclusion criteria:

1. Patients with coagulation disorders, collagen vascular diseases, and thyroid disorders.
2. Patients with valvular heart diseases and congenital abnormalities of heart.

Procedure methodology

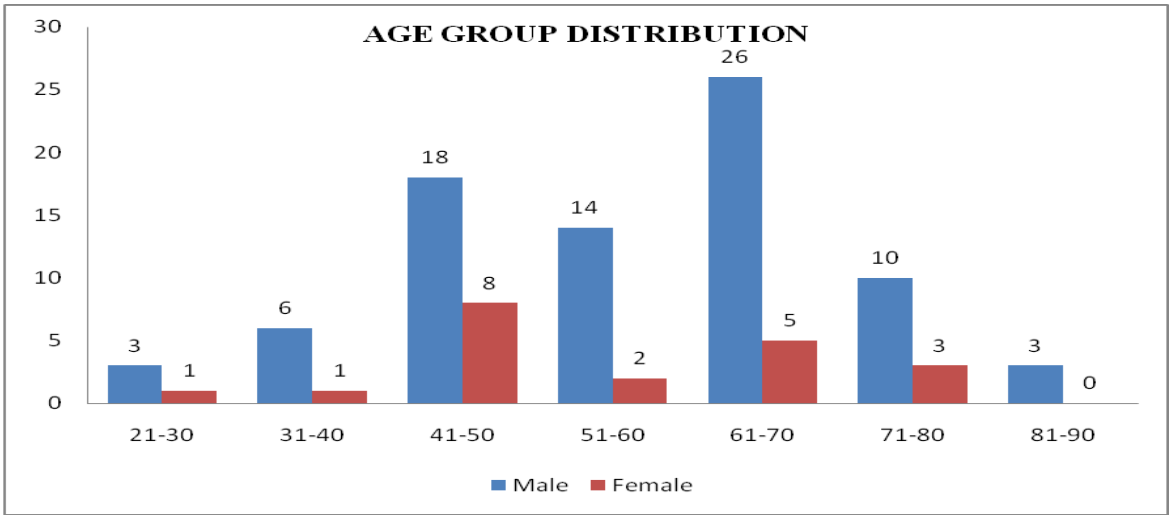
On admission detailed history was taken and a complete examination was done. ECG was done at the time of admission and was repeated if necessary. The serum cardiac enzyme levels were measured at the time of admission and at 6hrs after admission. In history special attention was paid to previous history of chest pain, smoking, diabetes mellitus, hypertension, physical activity, alcohol consumption and family history. Routine investigations such as blood examination for Hb% (Sahli's method). WBC counts, ESR (Westergren's method) were done. Urine was tested for sugar (using Benedict's solution) protein by (heat and acetic acid test) and microscopic examination. Fasting blood sugar and post prandial blood sugar were estimated by GOD (Glucose oxidase) and POD (peroxidase) method using diagnostic kit from ERBA Test. Blood samples were taken for estimation of lipid profile within 24hr of acute MI (before the inflammatory response from the MI leads to a temporary reduction in lipids) or 6 to 8 weeks later. Serum cholesterol was estimated by cholesterol oxidase method using ERBA test kit. Serum triglycerides were estimated by glycerol phosphate oxidase (GOP) method using ERBA test kit. Serum HDL cholesterol was estimated by precipitation method using ERBA test kit. LDL – cholesterol estimation was done using standard formula based on total cholesterol, triglyceride, and HDL cholesterol value. LDL–cholesterol = Total cholesterol – [HDL cholesterol + {triglyceride /5}]. VLDL was calculated by formula, VLDL-C = triglyceride /5. This formula is valid for triglyceride values less than 400mg/dl. Blood urea was estimated by GLDH (glutamate dehydrogenase) urease method using ERBA test kit (Talke and schibert et al). Serum creatinine was estimated by Jaffe's method (modified jaffe's reaction) using ERBA test kit. Cardiac enzymes – CKMB was estimated by immunoinhibition test using ERBA test kit.
PHYSICAL ACTIVITY: It was graded into 3 levels as follows 59

1. Heavy activity: Included farmers working actively in the fields, laborers of either sex.
2. Medium activity: Shop keepers, skilled workers, and women doing household work
3. Light activity (sedentary): Retired men and women leading a sedentary life.

Statistical methods: The data obtained was analyzed by descriptive statistics by means of percentage, proportions, mean etc

III. Result

Diagram-01: Bar diagram showing distribution of cases according to Age and Gender



Family History of IHD:
Out of 100 patients only 7 (7%) patients gave family history of ischemic heart disease.

Diet of Patient:
Out of 100 patients 20 patients were pure vegetarians. Remaining 80 patients used to consume mixed diet. Pure vegetarians have low incidence of AMI as compared to those taking mixed diet. This is probably since vegetarians consume more vegetable source of fatty acids than non-vegetarians who consume more of saturated fatty acids.

Alcohol consumption: In this study out of 100 patients 27% patient were alcoholic.

Table-1: Distribution of cases according to smoking

Type	Males	Females	Percentage
Smoker	50 (62.5%)	1	51%
Non-smoker	30 (37.5%)	1 0	49%
Total	8 0	2 0	100%

Table- 2: Distribution of cases according to hypertension

Type	Males	Females	Percentage
Hypertensive	20	10 (50%)	30%
Normotensive	60	10 (50%)	70%
Total	80	20	100%

Table- 3:BAR DIAGRAM SHOWING DISTRIBUTION OF CASES ACCORDING TO DYSLIPIDEMIA

Type	Present (no. of cases)	Absent (no. of cases)
Hypercholesterolemia	36	64
Hypertriglyceridemia	40	60
High LDL- cholesterol	24	76
Low HDL –cholesterol	54	46

Table-4: Distribution of cases according to diabetes mellitus and AMI

Type	Males	Females	Percentage
Diabetes	24	14	38%
Non diabetic	50	12	62%
Total	74	26	100%

Table-5: Distribution of cases according to level of the activity

Group	No. of cases	Percentage
Sedentary activity	40	40%
Medium activity	25	25%
Heavy activity	35	35%
Total	100	100%

Table -6: Distribution of cases according to location of the infarction

Location by ECG	No. Of cases	Percentage
Extensive ant.wall MI	45	45%
Anteroseptal MI	12	12%
Anterolateral MI	11	11%
Inferior wall MI	30	30%
Inferolateral AMI	1	1%
Inferior +Anterior AMI	1	1%

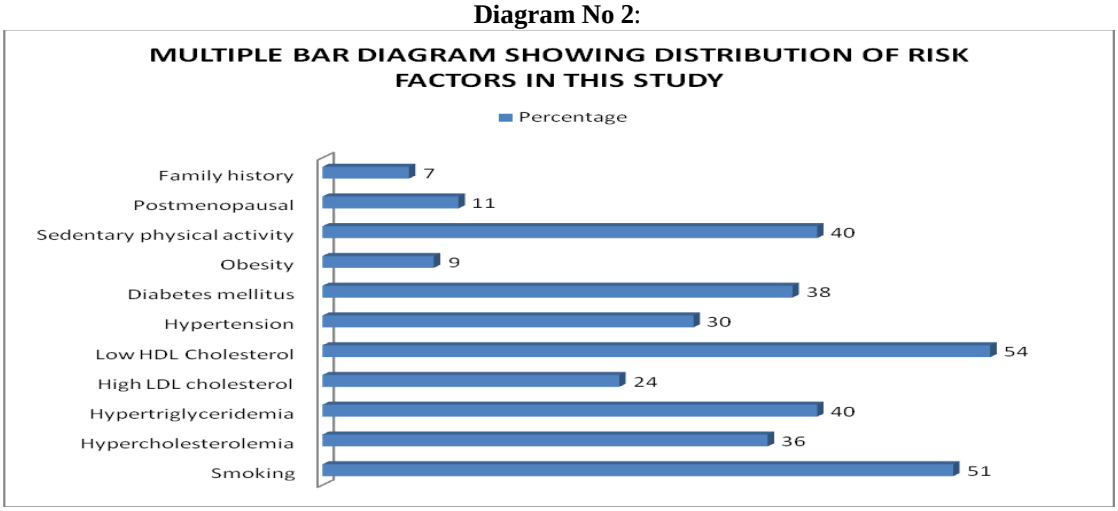
Table-7:: Showing prevalence of multiple risk factors in patients with AMI

No. of risk factors	No. of cases	Percentage
None	8	8%
One risk factor	12	12%
Two risk factors	25	25%
Three risk factors	18	18%
Four risk factors	19	19%
Five or more risk factors	18	18%

Table-8: Distribution of coronary risk factors in this study**.**

Coronary risk factors	No. of cases	Percentage
Smoking	51	51%
Hypercholesterolemia	36	36%
Hypertriglyceridemia	40	40%
High LDL cholesterol	24	24%
Low HDL Cholesterol	54	54%
Hypertension	30	30%
Diabetes mellitus	38	38%
Obesity	9	9%
Sedentary physical activity	40	40%
Postmenopausal	11	11%
Family history	7	7%

Diagram No 2:



IV. Discussion

In this study youngest patient was 28 year old the eldest was 84 year old. The maximum number of infarction occurred in the 5th decade and in 6th decade. Many studies have shown that IHD appears a decade earlier in India. In this study the mean age was 55.5 years. In this study 11 % of patients were below the age of 40 years. This correlates with the observation made by S.S.Kar et al[3]. In this study 80% patients were males and 20% were females. The male to female ratio was 4. This shows that male sex is associated with increased risk of IHD. H.S. Wasir and A.K. Bharani et al[4]. reported male to female ratio as high as 11.5: 1. Familial occurrence of CAD has been well recognized. Family history of CAD was present in only 7% of patients in this study. However H.S.Wasir, A.K.Bharani et al[4] observed family history of CAD in 38% of patients. Smoking is one of the major risk factor in this study. It is present in 51% of the cases and all are men. Out of 51 patients 40 people were beedi smokers and rest smoked cigarettes. 40 patients smoked for more than 10 years. This correlates with the observation made by S.S.Kar, J.S.Thakur et al[3], (2010) where 41% of rural patients were smokers. Hypercholesterolemia was observed in 36 % of patient in this study. This correlates with the observation made by J.Kaur, K.Bains et al[5], (2006), where 31% of rural patients had hypercholesterolemia. Hypertriglyceridemia was noted in 40 % of the patients in this study. J.Kaur, K.Bains et al[5], (2006) reported hypertriglyceridemia in 22% of patients. H.S.Wasir and A.K.Bharani et al, observed hypertriglyceridemia in 55% of cases. The anti-atherogenic role of HDL-C is well recognized and is independent of other coronary risk factor. In this study a large number of patients (54%) showed low HDL-C levels. J.Kaur, K.Bains et al, (2006) reported low HDL-Cholesterol in 28% of their patients. H.S.Wasir and A.K.Bharani et al, noticed low HDL-C in 64% of the patients. Hypertension was present in 30% of the cases in this study. This correlates with the similar observations made by J.Kaur, K.Bains et al, (2006) and S.S.Kar, J.S.Thakur et al, (2010) who reported hypertension in 32% and 33% of rural patients respectively. Diabetes mellitus was noticed in 38 % patients in this study. J.Kaur, K.Bains et al, (2006) reported diabetes in 22% of their patients. H.S.Wasir and A.K.Bharani et al, noticed diabetes in 16% of patients. Obesity is an independent coronary risk factor. In this study it has been observed that 9% of the patients are obese. This correlates with similar observations made by J.Kaur, K.Bains et al, (2006) and S.S.Kar, J.S.Thakur et al, (2010) who reported obesity in 7% and 11% of their rural patients respectively. Sedentary (light) physical activity was noticed in 40% of the patients in this study. Medium activity was noticed in 25% of the patients and heavy activity in 35% of the patients. J.Kaur, K.Bains et al, (2006) observed sedentary activity in 84% of their patients. Multiple risk factors played major role in this study, presenting in 80% of the patients. 19% of the patients had 4 risk factors. 18% of patients had 5 or more risk factors. This correlates with the observation made by H.S.Wasir and A.K.Bharani et al, (1984). 12% of patients had only one risk factor and 7% of the patients had no risk factor

V. Conclusion

Thus the commonly associated modifiable coronary risk factors in this study are, decreased HDL-cholesterol (54%), smoking (51%), sedentary physical activity (40%), hypertriglyceridemia (40%), diabetes mellitus (38%), hypertension (30%), increased LDL-cholesterol (24%) and obesity (9%). 7% of the patients in this study did not have any of the known conventional risk factors. The occurrence of acute myocardial infarction in such patients could be due to presence of undetected novel risk factors.

This study concludes that above conventional risk factors play a major role in genesis of coronary heart disease. Modification of these factors by pharmacotherapy, diet, exercise and behavioural therapy can improve

the prognosis and reduce the mortality significantly along with bringing down the incidence of CHD in general population.

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