



## Original Research Article

# Prevalence of conventional risk factor in acute myocardial infarction among Jammu division population

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## ARTICLE INFO

## Article history:

Received 14-02-2019

Accepted 16-01-2020

Available online 13-03-2020

## Keywords:

Acute myocardial infarction

Coronary heart disease

Jammu Division

Conventional Risk factor

Prevalence

## ABSTRACT

Coronary heart disease (CHD) is the most common cause of death worldwide with an estimated 7 million deaths per year. The majority of these deaths are due to acute myocardial infarction (AMI), so the burden of illness and mortality from AMI is immense worldwide. A region based study was designed and implemented in Government Medical College, Jammu. The outputs obtained have established that the various conventional risk factors like Sex, Age, Dietary pattern, Smoking, Alcohol consumption do have similar pattern in Jammu region as found in rest of the world. Males are more prone to AMI as compared to females.

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## 1. Introduction

Cardiovascular diseases are the leading cause of disease burden and deaths globally. The burden from the leading cardiovascular diseases in India— ischemic heart disease and stroke—varies widely between the states. Their increasing prevalence and that of several major risk factors in every part of India, especially the highest increase in the prevalence of ischemic heart disease. CVD is a major public health problem leading to premature deaths and morbidity across all districts of J&K. The increasing burden of CVD and its risk factors have to be addressed urgently in this population of J&K. Although there have been impressive advances in the capacity for preventing and treating CVD globally. They need much enhancement across all of India with particular attention to the relatively less developed states like Jammu division where non-communicable diseases have been increasing in India, a major finding of concern is that the highest rate of increase in heart disease and diabetes is in less developed states.<sup>1</sup>

Our study findings serve as a useful reference for framing policies and to plan programs more effectively for the prevention and treatment of CVD in Jammu.

Now-a-days cardiovascular diseases (CVD) are the most common cause of death worldwide. As per World Health Organization (2012), an estimated 17.5 million people died from cardiovascular diseases (CVDs), representing 31% of all global deaths. Of these deaths, an estimated 7.4 million were due to coronary heart disease and 6.7 million were due to stroke. In 2013, CVD still accounted for 30.8% (800,937) of all 2,596,993 deaths; approximately one of every three deaths in the United States.<sup>2</sup> Data published by WHO in 2016 indicates that 37% of deaths are caused by CVDs. 16 million deaths which happened in 2016 below 70 years of age were due to non-communicable diseases.

India is estimated to have lost 8.7 billion international dollars in 2005 because of CHD stroke and diabetes. These estimates increased to 54 billion international dollars by 2015. India's growth of gross domestic product (GDP) is estimated to fall by 1% because of the combined economic impact of CHD stroke and diabetes.<sup>3</sup>

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There are estimated 40 million heart patients in India. 17.5 million People die each year in India from cardiovascular diseases. 80% of all cardiovascular deaths are due to heart attacks and strokes, 74% of urban Indians are at risk of cardiovascular diseases. Out of which 19 million reside in urban areas and 21 million in rural areas. This suggests heart diseases are fast becoming an epidemic in rural India and a structured solution is needed for combating the issue.<sup>4</sup>

In 2016, there were an estimated 62.5 million and 12.7 million years of life lost prematurely due to CVD in India and the US, respectively.<sup>5</sup>

Ischemic heart disease was the leading cause of disability-adjusted life-years [DALYs] in India in 2016, and strokes the fifth leading cause. Ischemic heart disease contributed 17.8% (95% UI 16.8-18.5) of total deaths and 8.7% (7.9-9.5) of total DALYs, and stroke contributed 7.1% (6.6-7.5) of total deaths and 3.5% (3.2-3.9) of total DALYs. The proportion of deaths and DALYs from Ischemic heart disease was significantly higher in men than in women, but were similar in the two sexes for stroke<sup>6</sup>

A cross sectional study in Jammu and Kashmir has shown that the overall prevalence of CHD in the population was 7.54%. The overall rural prevalence was 6.70% and urban prevalence was 8.37%. Prevalence of CHD was higher in males, 7.88% and slightly lower in females, 6.63%.<sup>7</sup> The huge consumption of red meat varieties is one of the main contributing factors for increasing trends of CVD in Jammu & Kashmir.

## 2. Materials and Methods

A case control retrospective study was conducted on the patients admitted in Government Medical College, Jammu during the period November 2011 to February 2013. Institutional ethics committee and approval was taken (IEC/Pharma

Criteria for selection of patients and normal subjects were defined as per standard guidelines of AMI.

### 2.1. Sampling criteria

### 2.2. Inclusion criteria

#### 2.3. AMI Patients

1. Patients presenting with AMI disease admitted in Government Medical College, Jammu.
2. Age criteria: - 25 to 80 years.
3. TROP-T POSITIVE
4. ECG - Abnormal

#### 2.4. Normal subjects or controls

1. Non-Diabetic
2. Non-Smoker
3. Non-Alcoholic

4. Blood Pressure: - 120/80 (www.bloodpressure.uk.org )
5. Lipid Profile (within normal range) (As per NCEP guidelines)

### 2.5. Exclusion criteria

For Control population, patients with any kind of disease and disorder were excluded.

For the study 80 patients chosen as AMI patients and 60 patients were taken as controls.

Group 1:- Patients admitted in Coronary Cardiac Unit (CCU) having

Group 2:- Normal subjects were having no history of CHD.

Whenever first time any patient visited Government Medical College, Jammu. Performa (as per below mentioned details ) was given to him/her for his/her demographic details. Then the details were reviewed and case was included / excluded in the study.

| <b>PERFORMA FOR PATIENT DETAILS</b> |         |
|-------------------------------------|---------|
| NAME:                               | Date:   |
| Sex: F      M                       | MRD NO: |
| AGE:                                | Mob No: |
| R/O:                                |         |
| <b>HISTORY:-</b>                    |         |
| Smoker-                             |         |
| Hypertension-                       |         |
| Diabetes mellitus-                  |         |
| Stress-                             |         |
| Sedentary/Active life style-        |         |
| Alcoholic/non alcoholic-            |         |
| Dietary habit-                      |         |
| Blood pressure-                     |         |
| Chest pain-                         |         |
| Angina/Breathlessness/Palpitation-  |         |

**Fig. 1:** Format of Performa

### 2.6. Measurement of various parameters

First of all written consent was taken from all the patients included in the study. Then 2ml EDTA (Purple top vacutainer) and 3 ml plain samples vacutainer) was drawn from ante-cubital laboratory; serum was separated. The EDTA sample was centrifuged at 3000 rpm for 10 minutes and plasma was obtained. Both samples obtained were then preserved at -20 C until assays was run.<sup>8</sup>

## 2.7. Objective of the study

1. To find out the association between the history of patients and risk of AMI.
2. To estimate the effect of demographic variables in patients with AMI and Control population.
3. To establish the effectiveness of already existing conventional risk factors for AMI in Jammu population.

## 3. Results

For the study a total of 140 patients were selected. Out of 140 cases 80 patients were chosen who were suffering from AMI and 60 non AMI patients were taken as controls.

### 3.1. District wise distribution

Out of 60 normal cases 54(91.7%) controls were from Jammu district only 6 (8.3%) cases were from other districts. (Figures 2 and 3) Out of 80 AMI patients 50(62.5%) belonged to Jammu district and 30(37.5%) belonged to other adjoining areas. (Figures 4 and 5) Udhampur, Kishtwar, Samba, Rajouri, Doda, Kathua, Poonch, Ramban and Reasi.

DISTRICTWISE PERCENT DISTRIBUTION OF NORMAL CONTROLS

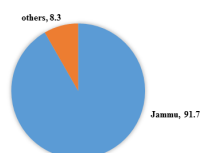


Fig. 2: Distribution of Control population from Various Districts

DISTRICT WISE ( OTHER THAN JAMMU ) PERCENTAGE DISTRIBUTION OF NORMAL CONTROLS

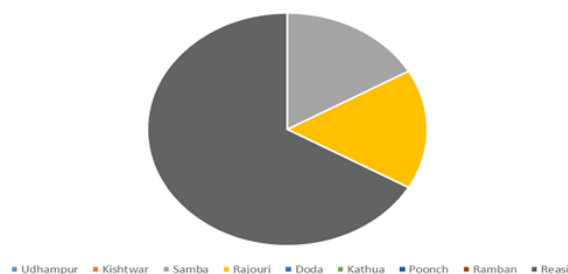


Fig. 3: Distribution of Control population from Various Districts ( Other than Jammu)

Cardiac biomarkers have an important role in diagnosis of AMI.

Comparing the district wise percentage distribution (Table 1) of control and AMI population it is observed that 50 out of 80 (62.5%) patients suffering from AMI belonged to Jammu district. Whereas 6(7.5%) patients each were

Districtwise Percentage distribution of Patients with AMI

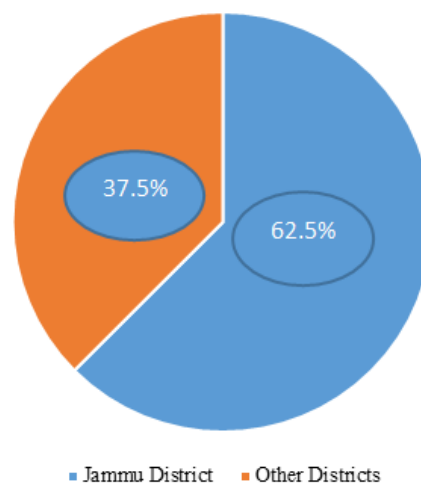


Fig. 4: Distribution of AMI Patients population from Various Districts

District wise (other than Jammu) percentage distribution of AMI patients

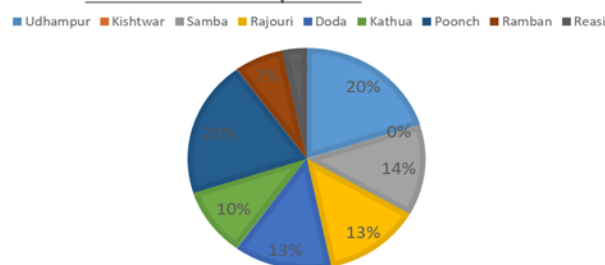


Fig. 5: Distribution of AMI Patients population from Various Districts (Other than Jammu)

from Udhampur & Poonch and 4(5%) patients each were from Samba, Rajouri, Doda. Also, 3(3.8%), 2(2.5%) and 1(1.3%) patients of AMI were from Kathua, Ramban and Reasi respectively.

### 3.2. Sex wise distribution

In our study number of male AMI patients (64 {80%}) was more as compared to female AMI patients (16{20%}) in our study indicating more prevalence of AMI among the male population as compared to female population. (Table 2)

### 3.3. Age wise distribution

Study subjects (Control and AMI) were subdivided into six subgroups on the basis of age (31-80yrs). Age of control cases were from 31-70yrs. A MI was diagnosed in patients ranging age from 31-80 yrs (Table 3).

**Table 1:** Distribution of control Population and AMI in various Districts of Jammu Division.

| Districts | Control              |       | AMI                  |       |
|-----------|----------------------|-------|----------------------|-------|
|           | Total population(60) | % age | Total population(80) | % age |
| Jammu     | 54                   | 90    | 50                   | 62.5  |
| Udhampur  | 0                    | 0     | 6                    | 7.5   |
| Kishtwar  | 0                    | 0     | 0                    | 0     |
| Samba     | 1                    | 1.7   | 4                    | 5     |
| Rajouri   | 1                    | 1.7   | 4                    | 5     |
| Doda      | 0                    | 0     | 4                    | 5     |
| Kathua    | 0                    | 0     | 3                    | 3.8   |
| Poonch    | 0                    | 0     | 6                    | 7.5   |
| Ramban    | 0                    | 0     | 2                    | 2.5   |
| Reasi     | 4                    | 6.7   | 1                    | 1.3   |

**Table 2:** Distribution of Males and Females among Control and AMI Population

| Sex    | Control Total population (60) |       | AMI Total population (80) |       |
|--------|-------------------------------|-------|---------------------------|-------|
|        | Number of non AMI subjects    | % age | Number of patients        | % age |
| Male   | 33                            | 55%   | 64                        | 80    |
| Female | 27                            | 45%   | 16                        | 20    |

**Table 3:** Distribution of Control and AMI Population in various Age Groups

| Age (Years) | Control Total population (60) |       | AMI Total population (80) |       |
|-------------|-------------------------------|-------|---------------------------|-------|
|             | Number of non AMI subjects    | % age | Number of patients        | % age |
| 31-40       | 25                            | 41.7  | 4                         | 5     |
| 41-50       | 20                            | 33.3  | 17                        | 21.3  |
| 51-60       | 12                            | 20.0  | 29                        | 36.3  |
| 61-70       | 3                             | 5.0   | 21                        | 26.3  |
| 71-80       | 0                             | 0     | 9                         | 11.3  |

Among AMI patients maximum patients were of the age in between 51-60 yrs [N-29(36.3%)], 17(21.3%) patients were in between 41-50 yrs age and 21(26.3%) patients were from 61-70 yrs age. Only 4(5%) and 9(11.3%) patients were from 31-40 yrs and 71-80 yrs of age respectively. So it is observed that major proportions of AMI patients were from 41-70 yrs of age.

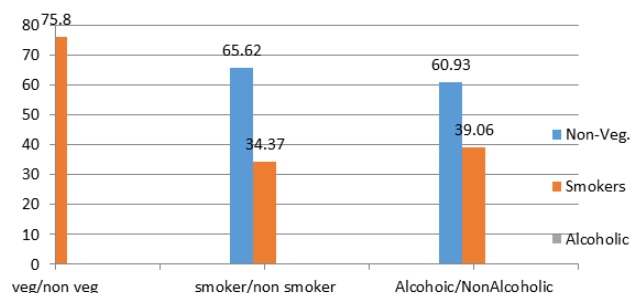
### 3.4. Conventional risk factors

AMI patients were also studied as per risk factors (Dietary pattern, Smoking, Alcoholism) for any significance.

The results were taken individually for each conventional risk factor and were interpreted.

While evaluating the data (Figure 6) it was found that out of 64(80%) males 11(17.18%) males were found to be vegetarians and 53(82.81%) were non vegetarians while 10(62.5%) females were vegetarians and 6(37.5%) were non vegetarians.

While comparing smokers/ non-smokers in AMI patients it was found that 43 AMI patients (53.8%) were smokers and 37(46.2%) were non-smokers. It was seen that 42(65.62%) males were smokers and 22(34.37%) were non-smokers but in female AMI patients 15(93.75%) females

**Fig. 6:** Risk Factors in AMI subject patients

were non-smokers and only one (6.25%) was smoker.

AMI patients when screened for alcoholic nature it was found that 41(51.2%) AMI patients were non-alcoholic and 39(48.8%) as alcoholics.

In our study of AMI patients 39(60.93%) males were a and 25 (39.06%) were non-alcoholic on- alcoholic.

AMI incidence was high in non-vegetarians as compared to vegetarians ( $p < 0.0001$ ). Similarly smokers have significant risk of AMI than non-smokers ( $p < 0.0001$ ). Alcohol was a major risk factor for AMI in Jammu division

**Table 4:** Distribution for Conventional Risk Factors in Control and AMI Population.

| Conventional Risk Factors |               | AMI Males |       | Females |       | Total |       | Significance (p value) |
|---------------------------|---------------|-----------|-------|---------|-------|-------|-------|------------------------|
|                           |               |           | %     |         | %     |       | %     |                        |
| Diet                      | Veg           | 11        | 17.18 | 10      | 62.5  | 21    | 26.25 | .0001                  |
|                           | Non veg       | 53        | 82.81 | 6       | 37.5  | 59    | 73.8  |                        |
| Smoking                   | Smoker        | 42        | 65.62 | 1       | 6.25  | 43    | 53.8  | <.0001                 |
|                           | Non smoker    | 22        | 34.37 | 15      | 93.75 | 37    | 46.2  |                        |
| Alcoholic                 | Alcoholic     | 39        | 60.93 | 0       | 0     | 39    | 48.75 | <.0001                 |
|                           | Non Alcoholic | 25        | 39.06 | 16      | 100   | 41    | 51.25 |                        |

population. Incidence of AMI was statistically significant ( $p < 0.0001$ ) in alcoholic patients as compared to non-alcoholics.

#### 4. Discussion

The Registrar General of India reported that CHD led to 17% of total deaths and 26% of adult deaths in 2001-2003, which increased to 23% of total and 32% of adult deaths in 2010-2013. Further review of cardiovascular epidemiology studies in India indicates that CHD has become an important public health problem in India.<sup>9</sup> there is an urgent need to promote primordial, primary and secondary prevention strategies. Primordial strategies such as smoking/tobacco cessation, physical activity and healthy dietary habits should prevent risk factors from occurring in the first place.

Analysis of 2195 community-dwelling adults without known CHD demonstrated that an index of non-traditional risk factors for CHD could independently predict risk of CHD-related hospitalization and death. This finding suggests that CHD risk assessment may benefit from consideration of general health information as well as from traditional risk factors<sup>10</sup>

The World Health Organization (WHO) and Global Burden of Disease Study also have highlighted increasing trends in years of life lost (YLL) and disability-adjusted life years (DALY) from CHD in India.<sup>10</sup> In a Study done by Lanasa et al (2007) on South American population, it was found that 74.9% males suffer from AMI which is very close to our study.<sup>11</sup> A study led by university of Leicester has concluded that males are more prone to AMI.<sup>12</sup> The cohort study of 1.3 million patients hospitalized in US veterans Health administration facilities found an incidence of in hospital AMI of 4.27 per 1000 admissions. In hospital AMI is common and is associated with prior cardiovascular disease, physiological disturbances and poor survival.<sup>13</sup> A descriptive study on hospital based patients was conducted in Karnataka involving a sample of 40 patients with AMI over the span of two years. Out of 40 patients 15% belong to 30 - 39 years, 17.5% belong to 40 - 49 years, 22.5% belong to 50 - 59 years, and maximum patients (45%) were in age group of 60 years and above. Incidence of AMI was more

in males than in females. Male population was 92.5% and female population was only 7.5% proving that males are at more risk than females.<sup>14</sup>

In another case control study<sup>15</sup> on 265 cases of AMI and 265 controls the results of final model of logistic regression analysis for risk factors of AMI included 11 risk factors at  $\alpha = 0.05$ . Various risk factors included in the study were waist hip ratio, body mass index, stress at home in last 1 year, hypertension, family history of CHD, past history of gingival sepsis, tobacco smoking, raised total serum cholesterol etc. Cigarette smoking is a major cause of coronary heart disease, which leads to heart attack.<sup>16</sup> The findings confirm the role of conventional risk factors for cardiac disease and highlight need for research into the association between chronic infections with AMI. Smoking cessation after AMI decreases the risk of recurrent AMI and mortality by 30 to 50%.<sup>17</sup> Similarly A systematic review and meta analysis of 14 studies including 31 risk estimates was carried out on electronic database from 1980 to 2009 and concluded that the cardio protective effect of moderate alcohol consumption disappears when average light to moderate drinking is mixed irregular binge drinking occasions ( $>60$  g of pure alcohol or  $\geq 5$  drinks per occasion at least monthly).<sup>18</sup> This could increase CHD risk by 45%. Alcohol consumption in a binge (a short period of excessive consumption) kind of pattern also results in heart diseases.<sup>19</sup>

Another prospective cohort study on hospitalized AMI patients in the U.S. showed that 29% patients never had smoked, 34% were former smokers (quit before AMI) and 37% were active smokers, of whom 46% had quit before 1 year (recent quitters). Thus, smoking is associated with more angina and worse heart related quality of life in all domains, while smokers who quit after AMI have similar angina levels and mental health as non-smokers. These observations may help encourage patients to stop smoking after AMI.<sup>20</sup>

In our study maximum percentage of males were non vegetarian in our study, resulting in high fatty deposits in body which is further related to heart diseases. Diet high in saturated fatty acids increases the risk of heart disease and stroke. It is estimated to cause about 31% of coronary heart

disease and 11% of stroke worldwide. Similar findings were observed in a study done on UK population concluding that non vegetarians are more prone to AMI.<sup>21</sup>

CHD is preventable. One of the best prescriptions to prevent CHD is to take the personal responsibility for learning about modifiable cardiac risk factors, followed by an objective evaluation of your individual level of risk and adopt a lifestyle that reduces or eliminates the major risk factors found to be associated with developing CHD. This is, of course, easier said than done. However dying from or being permanently disabled by CHD is not a good alternative. Given the gruesome morbidity and mortality statistics of CHD, experiencing such an alternative is more of a fact that it is a fiction.<sup>22</sup> In a recent study published in BMJ (2019) stated that reducing the burden of IHD is a key priority for all countries. Premature MI refers generally refers to MI in Men < 55 yrs or women < 65 yrs. Premature MI is a major contributor to CVD which claimed 17.6 million lives globally in 2016. Reducing premature MI and CVD is a key priority for all nations. Systematic review is being conducted by them to describe the association between risk factors (Demographics, lifestyle factors and biomarkers) and premature MI.<sup>23</sup>

## 5. Conclusion

It was found that among all districts of Jammu & Kashmir, population of Jammu district suffers more from AMI as compared to other districts. This is attributed to the life style of the population of Jammu city, which is very different from the population of other rural areas.

The AMI prevalence was studied in both the sexes through percentage distributions. It was found that Males are more prone to AMI than Females. So, Gender itself predisposes a person towards heart diseases.

It was observed that maximum percentage of people suffering from AMI was having non vegetarian type of diet pattern and there was statistically significant difference. ( $p < 0.0001$ ). Non vegetarian diet also acts as a big causal factor for AMI.

It was observed that only male patients were smokers and while comparing with non- smokers the difference was found to be statistically significant ( $p < 0.0001$ ).

It was found that the role of alcohol is also causal factor and most of the alcoholic males showed more predispositions to AMI. This is also statistically significant ( $p < 0.0001$ ).

The prevalence of AMI was also studied in different age groups and it was observed that the populations in the age group of 51-60 years suffer more from AMI. Thus, age factor also seems to be a causal factor for heart disorders as the age progresses the chance of attack of AMI or Heart disorder also increased.

## 6. Source of funding

None.

## 7. Conflict of interest

None.

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**Cite this article:** Raina K, Verma N, Bhatia AS, Khanum S, Verma HN. Prevalence of conventional risk factor in acute myocardial infarction among Jammu division population. *Int J Clin Biochem Res* 2020;7(1):91-97.