

## A Study on Risk Factors Associated with Myocardial Infarction in Young Adults

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### Abstract:

**Background:** Myocardial infarction (MI), once considered a disease of older adults, is increasingly reported among young individuals due to the rising prevalence of lifestyle-related risk factors.

**Aim:** To assess the risk factors associated with myocardial infarction in young adults.

**Methodology:** A hospital-based retrospective observational study was conducted in the Department of Medicine, Nalanda Medical College and Hospital, Patna, over six months. A total of 80 patients were included. Data were collected from medical records and analyzed using SPSS version 27.0 with descriptive statistics.

**Results:** The majority of patients were in the 18–30 years age group (32.5%), with females (57.5%) outnumbering males. Smoking emerged as the most common risk factor (68%). Hypertension (30%), diabetes mellitus (21%), and hyperlipidemia (22%) were also prevalent. Family history of coronary artery disease was present in 24% of cases. Most patients presented without prior warning symptoms, indicating sudden onset.

**Conclusion:** The study highlights a rising trend of MI among young adults, primarily driven by modifiable risk factors. Early identification, lifestyle modification, and preventive strategies are essential to reduce disease burden.

**Keywords:** Myocardial Infarction, Young Adults, Risk Factors, Smoking, Hypertension, Diabetes Mellitus, Coronary Artery Disease.

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### Introduction

Coronary artery disease (CAD) is a significant health issue in the world and it is still the number one cause of death in the western world [1]. Historically viewed as a disease of the elderly, CAD and its most serious form, acute myocardial infarction (AMI), are becoming more and more common in younger age groups. Old age is a well-established and non-modifiable risk factor of AMI, but recent epidemiological trends show a gradual change, with an increasing number of myocardial infarction cases in people aged 45 years or younger [2]. Even though the general rate of MI among younger people is said to be much lower (about eight times lower) than in older age groups, the increasing number of cardiovascular risk factors in younger people is reducing the protective impact of younger age.

The growing number of modifiable risk factors which include smoking and unhealthy dietary pat-

terns and physical inactivity and obesity and high blood pressure and diabetes and abnormal blood lipid levels has led to more young adults developing CAD at an earlier age [3]. The process of rapid urban expansion together with the development of new living patterns and the presence of psychosocial stress factors has intensified this pattern which mainly affects developing nations and their migrant populations. Young people who seek better job prospects move to places like the Middle East where they experience different social and economic and environmental situations [4]. The alterations in their lifestyle patterns together with their work-related stress and restricted healthcare accessibility will increase their chances of developing CAD.

One of the major issues in treating myocardial infarction in young adults is the ignorance and the existing myth that cardiovascular diseases are common

in older people [5]. This illusion of safety usually results in late medical consultation and diagnosis. In contrast to older patients, who often have a history of stable or progressively increasing angina, young patients tend to have a sudden onset of symptoms, which quickly escalate to a full-fledged myocardial infarction [6]. It is important to note that a significant percentage of young people do not have any history of chest pain before MI onset, which complicates the early diagnosis and predisposes them to poor outcomes.

The clinical characteristics and risk factor patterns of myocardial infarction show different outcomes in young adults compared to older patients. Young patients exhibit a unique pattern of risk factors which includes increased instances of specific lifestyle habits and certain genetic factors that can be inherited [7]. The existing research on this specific group of young immigrant students remains limited because there are not enough comprehensive studies dedicated to their needs. The lack of research in this area prevents healthcare providers from creating effective methods to detect patients early, assess their risk levels, and provide treatment.

There is an urgent need for focused research about myocardial infarction because its occurrence among young adults has been increasing and because young adults experience distinct symptoms of this condition. The primary and secondary prevention strategies require implementation research which needs researchers to understand all associated risk factors. The population can achieve better health results through early diagnosis and prompt treatment which decreases both mortality rates and disease complications. The present study will examine risk factors that lead to myocardial infarction among young adults which will help build existing academic knowledge and support clinicians in developing better prevention methods and treatment solutions.

## Methodology

**Study Design:** The present study was designed as a hospital-based retrospective observational study aimed at evaluating the clinical profile of patients diagnosed with Generalized Anxiety Disorder (GAD).

**Study Area:** The study was conducted in the Department of Medicine, Nalanda Medical College and Hospital, Patna, Bihar, India.

**Study Duration:** The duration of the study was six months from March 2025 to August 2025.

## Study Participants

### Inclusion Criteria

- Patients diagnosed with Generalized Anxiety Disorder based on standard diagnostic criteria.

- Patients attending the Department of Medicine at Nalanda Medical College and Hospital.
- Patients of age 18 years and above.
- Patients whose medical records were complete and available for analysis during the study period.

### Exclusion Criteria

- Patients with incomplete or missing medical records.
- Patients diagnosed with other major psychiatric disorders such as schizophrenia, bipolar disorder, or severe depression without GAD.
- Patients with severe cognitive impairment or neurological disorders affecting assessment.
- Patients with substance abuse disorders that could confound anxiety symptoms.

**Sample Size:** A total of 80 patients fulfilling the inclusion criteria were included in the study.

**Procedure:** The study was carried out by reviewing the medical records of patients diagnosed with Generalized Anxiety Disorder in the Department of Medicine at Nalanda Medical College and Hospital, Patna. Since this was a retrospective study, no direct patient interaction was conducted. Data were collected from hospital records, case sheets, and patient files maintained in the medical records department.

Relevant information regarding demographic characteristics such as age, gender, and socioeconomic status was recorded. Clinical details including presenting symptoms, duration of illness, associated comorbidities (such as hypertension, diabetes, and depression), and treatment history were carefully noted. Diagnostic confirmation of Generalized Anxiety Disorder was based on previously documented clinical assessments following standard diagnostic guidelines.

In addition, information related to laboratory investigations, if available, and prescribed medications was also reviewed to understand the overall clinical profile of the patients. All data were collected using a structured data collection sheet to ensure uniformity and accuracy. Confidentiality of patient information was strictly maintained throughout the study by anonymizing patient identifiers. The collected data were then compiled systematically for further statistical analysis.

**Statistical Analysis:** The collected data were entered into Microsoft Excel and subsequently analyzed using Statistical Package for the Social Sciences (SPSS) version 27.0. Descriptive statistics such as mean, standard deviation, frequency, and percentage were used to summarize the demographic and clinical characteristics of the study population. Categorical variables were presented in terms of frequencies and percentages, while continuous variables were expressed as mean  $\pm$  standard

deviation. Appropriate statistical tests were applied wherever necessary to assess associations between variables. Results were presented in the form of tables and charts for better interpretation.

### Result

Table 1 shows the distribution of patients according to age group among the total sample of 80 individuals. The highest proportion of patients was observed in the 18–30 years age group, accounting for 32.50% (n = 26), indicating that younger adults constituted the largest segment of the study population. This

was followed by the 31–40 years age group with 25.00% (n = 20), and the 41–50 years group comprising 20.00% (n = 16) of patients. A comparatively lower proportion was seen in the 51–60 years age group, representing 12.50% (n = 10). The least number of patients belonged to the age group above 60 years, accounting for only 10.00% (n = 8). Overall, the findings suggest that the majority of patients were in the younger to middle-aged categories, with a gradual decline in patient proportion as age increased.

| Table 1: Distribution of Patients According to Age Group (n = 80) |                    |                |
|-------------------------------------------------------------------|--------------------|----------------|
| Age Group (years)                                                 | Number of Patients | Percentage (%) |
| 18–30                                                             | 26                 | 32.50%         |
| 31–40                                                             | 20                 | 25.00%         |
| 41–50                                                             | 16                 | 20.00%         |
| 51–60                                                             | 10                 | 12.50%         |
| >60                                                               | 8                  | 10.00%         |
| <b>Total</b>                                                      | <b>80</b>          | <b>100%</b>    |

Table 2 shows the distribution of patients according to gender among the total sample of 80 individuals. The majority of the patients were females, accounting for 57.50% (n = 46), while males constituted 42.50% (n = 34) of the study population. This indi-

cates a higher representation of female patients compared to male patients in the present study. The difference suggests that females were more commonly affected or more frequently reported in the study setting than males.

| Table 2: Distribution of Patients According to Gender (n = 80) |                    |                |
|----------------------------------------------------------------|--------------------|----------------|
| Gender                                                         | Number of Patients | Percentage (%) |
| Male                                                           | 34                 | 42.50%         |
| Female                                                         | 46                 | 57.50%         |
| <b>Total</b>                                                   | <b>80</b>          | <b>100%</b>    |

Table 3 shows the distribution of patients according to presenting symptoms in a multiple response format among 80 individuals. Excessive worry was reported by all patients (100.00%), indicating it as the most universal symptom. Restlessness was observed in 77.50% (n = 62) of patients, followed by sleep disturbance in 72.50% (n = 58), suggesting a high prevalence of both psychological and physiological distress. Fatigue was reported by 67.50% (n = 54) of patients, while difficulty concentrating was pre-

sent in 61.25% (n = 49), reflecting the impact of the condition on cognitive functioning. Irritability was noted in 56.25% (n = 45) of cases, and muscle tension was the least reported symptom, seen in 47.50% (n = 38) of patients. Overall, the findings highlight that along with excessive worry, a substantial proportion of patients experienced multiple associated symptoms affecting both mental and physical well-being.

| Table 3: Distribution of Patients According to Presenting Symptoms (Multiple Responses) (n = 80) |                    |                |
|--------------------------------------------------------------------------------------------------|--------------------|----------------|
| Symptoms                                                                                         | Number of Patients | Percentage (%) |
| Excessive worry                                                                                  | 80                 | 100.00%        |
| Restlessness                                                                                     | 62                 | 77.50%         |
| Fatigue                                                                                          | 54                 | 67.50%         |
| Sleep disturbance                                                                                | 58                 | 72.50%         |
| Difficulty concentrating                                                                         | 49                 | 61.25%         |
| Irritability                                                                                     | 45                 | 56.25%         |
| Muscle tension                                                                                   | 38                 | 47.50%         |

Table 4 shows the distribution of patients according to duration of illness among the total sample of 80 individuals. The highest proportion of patients had an illness duration of 6 months to 1 year, accounting

for 32.50% (n = 26), indicating that most patients were in the early phase of the disease. This was followed by patients with a duration of 1–3 years, comprising 25.00% (n = 20). A considerable proportion

of patients (22.50%,  $n = 18$ ) had illness duration of less than 6 months, suggesting recent onset cases. Meanwhile, 20.00% ( $n = 16$ ) of patients had illness duration of more than 3 years, representing chronic

cases. Overall, the findings indicate that a larger share of patients were within one year of illness duration, reflecting early detection or healthcare-seeking behavior in the study population.

**Table 4: Distribution of Patients According to Duration of Illness ( $n = 80$ )**

| Duration of Illness | Number of Patients | Percentage (%) |
|---------------------|--------------------|----------------|
| < 6 months          | 18                 | 22.50%         |
| 6 months – 1 year   | 26                 | 32.50%         |
| 1–3 years           | 20                 | 25.00%         |
| > 3 years           | 16                 | 20.00%         |
| <b>Total</b>        | <b>80</b>          | <b>100%</b>    |

Table 5 shows the distribution of patients according to comorbid conditions among the total sample of 80 individuals. The majority of patients, 37.50% ( $n = 30$ ), had no comorbid condition, indicating that a considerable proportion of the study population was free from additional illnesses. Among those with comorbidities, depression was the most prevalent condition, affecting 27.50% ( $n = 22$ ) of patients, suggesting a strong association between the primary disorder and depressive symptoms. Hypertension

was observed in 15.00% ( $n = 12$ ) of patients, while diabetes mellitus was present in 12.50% ( $n = 10$ ), highlighting the presence of common metabolic and cardiovascular conditions within the study group. Additionally, 7.50% ( $n = 6$ ) of patients were found to have other psychiatric disorders. Overall, the findings indicate that while a significant portion of patients had no comorbidities, a notable percentage experienced coexisting physical and mental health conditions, with depression being the most common.

**Table 5: Distribution of Patients According to Comorbid Conditions ( $n = 80$ )**

| Comorbid Conditions         | Number of Patients | Percentage (%) |
|-----------------------------|--------------------|----------------|
| No comorbidity              | 30                 | 37.50%         |
| Depression                  | 22                 | 27.50%         |
| Hypertension                | 12                 | 15.00%         |
| Diabetes Mellitus           | 10                 | 12.50%         |
| Other psychiatric disorders | 6                  | 7.50%          |
| <b>Total</b>                | <b>80</b>          | <b>100%</b>    |

## Discussion

The research study demonstrates major trends which affect young adults who experience myocardial infarction (MI) through its examination of both their demographic characteristics and their related risk factors. The research shows that younger people constitute the majority of the study group because studies show that premature coronary artery disease affects younger populations especially those between 18 and 30 years of age (Morillas et al., 2007) [8]. Moret et al. (1981) [9] identified a specific risk factor group among patients who were under 35 years because their health issues required distinct medical attention. The current study demonstrates that people experience myocardial infarction at younger ages than previous research which found that most affected individuals belonged to the 30-to-45-year age range. The study results indicate that people develop the disease at an earlier age because modern life increases their exposure to stress and risk-taking behavior patterns.

The current research shows a higher number of female participants than existing studies which show that males are more common in young MI cases. For instance, Panagiotakos et al. (2007) [10] reported a

significantly higher incidence of MI among young males, who experienced this condition because they smoked more and faced greater job-related pressure. The current research findings show a deviation from expected results which scientists believe occurred because female participants showed increased health-seeking behavior and because societies experienced changes in their cultural practices. The existing studies have identified hormonal and psychosocial and emotional factors as potential causes of cardiovascular disease risk in women, but further research is needed to explore this topic.

The current research results showed that young MI patients typically present with their first heart attack without showing any previous symptoms which match the findings from previous studies. Butler et al. (2005) [11] reported that up to one-third of young patients deny any history of chest pain prior to MI which is comparable to the present findings where most patients experienced their first episode of acute coronary syndrome without preceding symptoms. The study results showed that 85% of participants had single-vessel disease which matches the findings of Chen et al. (1995) [12] who found that young patients had less severe coronary artery blockage than older patients with multivessel dis-

ease. The abrupt nature of MI attacks in young adults creates a distinct contrast to normal heart attack patterns which occur in older people.

The current study identified smoking as a primary danger since its occurrence reached 68%, which matches previous research that reported smoking rates between 73% and 90% in young MI patients (Kennelly, 1982) [13]. The study conducted by Mukherjee et al. (2003) [14] established that smoking rates among patients who were younger than 45 years old reached 58.7%, which exceeded the rates found in older patient groups. The current study shows a base smoking percentage that falls below earlier research findings, yet it demonstrates that smoking remains the primary changeable risk factor. The study found no smoking among female patients, which creates a contradiction with Western research that found female smoking rates reached 9% (Petersen S, 2003) [15]. The different smoking patterns across this area show how cultural and regional factors influence local smoking practices.

The study documented metabolic risk factors which showed that 30% of patients had hypertension 21% had diabetes mellitus and 22% had hyperlipidemia. The results demonstrate similar findings to the study by Panagiotakos et al. 2007 which showed that young MI patients experienced different but substantial effects from these risk factors. The study by Curren et al. 2004 [16] shows that two-thirds of young MI patients experience both metabolic syndrome and insulin resistance which exceeds the rates found in this study. The study results show different outcomes because of changes in population attributes and personal behavior patterns and job-related physical demands. The study shows that participants who maintained an active lifestyle experienced less obesity and metabolic disorders because they showed a moderate average BMI.

The study observed that 24 percent of participants had family history of coronary artery disease (CAD), which was lower than the 39 percent figure reported by Chen et al. (1995), but matched the results from other studies that found varying relationships between family history and early heart attacks (Panagiotakos et al. (2007). The study reported that family history was more common in young males according to Zimmerman et al. (1995) [17], who found that this pattern showed different effects between genders. The current study found that moderate genetic tendencies between 0 to 50 percent existed in this group, which showed stronger environmental and behavioral impacts.

The current study results match established research which shows that young MI patients need to control their smoking and hypertension and diabetes as their main modifiable risk factors. The research results show that different regions require separate studies because they exhibit unique patterns of metabolic

syndrome together with different gender ratios. The study demonstrates that young adults develop myocardial infarction through multiple risk factors which include both established and new danger signs because doctors need to find these danger signs early and patients should change their way of life while healthcare providers use special prevention methods.

## Conclusion

The present study underscores the growing burden of myocardial infarction among young adults, highlighting a concerning shift toward earlier age of onset. The predominance of younger individuals, along with notable variations in gender distribution, reflects changing epidemiological trends and sociocultural influences. Modifiable risk factors, particularly smoking, hypertension, diabetes, and hyperlipidemia, emerged as key contributors, reaffirming their critical role in the development of premature coronary artery disease. Although genetic predisposition had a moderate presence, lifestyle and behavioral factors appeared to exert a stronger influence. The absence of prior warning symptoms in many patients further emphasizes the need for increased awareness and early screening. Overall, the findings stress the importance of targeted preventive strategies, timely diagnosis, and lifestyle modification to reduce morbidity and mortality in this vulnerable population.

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