

Original Research Article

A Study to Assess Precipitating Factors for Onset of MI among 18-45 Years Patients Admitted with Myocardial Infarction

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ABSTRACT

Introduction: Myocardial infarction (MI) is a serious health problem which causes substantial morbidity and mortality. MI in young adults (≤ 45 yrs) is being increasingly encountered in the recent years, especially among Indians and there is lack of exclusive data from the various regions of India. Paucity of published literature formed the basis of this study. There is scarce data regarding the precipitating factors prior to MI among young adults.

Material and Method: A retrospective observational cross-sectional analytical study was conducted on 100 young adults 18-45 yrs who were admitted with their first episode of MI. Data was gathered using semi-structured interview.

Result: Among the participants 91% patients were having typical chest pain. 8% were able to reach hospital before 1 hour from the onset of chest pain (mean time was 333.90 minutes). On the basis of ECG findings NSTEMI 6%, AWTMI 69%, IWMI 18%, antero-lateral wall MI 2%. Total 83% were having single vessel disease, 6% double vessel disease, 5% multi-vessel disease & 6% with normal coronary angiography. MI was observed more from 6am to 6pm (63.4%) as compared to 80% from 6pm to 6am ($p < 0.05$, chi square 8.757). Among all the subjects 24% were performing moderate to vigorous physical activities prior to onset of chest pain and males were more active than females (chi square 13.988, $p < 0.05$). Total 59% were at home, 21% at workplace, 2% were travelling, 18% were at places like market, playground etc. prior to onset of chest pain 48% were consuming tobacco and only 15% were consuming alcohol. Majority of study participants used public transport to reach the hospital such as taxi (49%), auto (12%), ambulance (11%), bike (8%), train (7%), private car (4%) and some used multiple vehicles. Stressor responsible for the MI reported by patients were job related stressors (10%), family related stressors (10%), oily food related stressors (3%), finance related stressors (5%), health related stressors (4%) and 66% didn't experienced any stressors, 2% other stressors.

Conclusion: Myocardial infarction is not a random event, but may frequently result from identifiable precipitating activities.

Key words: precipitating factors, Myocardial infarction

INTRODUCTION

Myocardial infarction (MI) is a serious health problem which causes substantial morbidity and mortality. The seriousness of coronary artery disease is heightened by the fact that approximately a

third of patients present with sudden death as their first manifestation. [1] Triggering research continues to evolve in concert with our understanding of the patho-preventive strategies. The circadian rhythm in the incidence of cardiac events was one of the

first triggering patterns to be discovered; peak frequencies of MI and sudden cardiac death were observed in the morning hours after waking [2,3] Routine activities of daily life such as physical exertion and smoking, [4] as well as a variety of negative emotions such as anger, tension, and sadness, [5] were found to induce myocardial ischemia. Studies have found an increased frequency of sudden cardiac death and MI in relation to catastrophes such as an earthquake [6] or war, [7] suggesting that psychological and emotional stress brought on by such disasters can trigger cardiac events.

Throughout the century the possible association of external stimuli with onset of MI has been debated. Among the factors that have been suggested as precipitating myocardial infarction are strenuous physical activity and emotionally upsetting life events. Some studies have suggested that cardiac events occur with increased frequency during or within a few hours after physical exertion. [8] An increasing trend of MI in young adults below the age of 45 yrs is being noticed among the South Asian population in recent years, particularly among Indians. Apart from extreme poverty and infectious diseases, control of heart attack in young adults can be most rewarding for Indians in 21st century for saving productive life years. MI being a lifestyle associated disease, genetic inheritance, tobacco consumption in various forms, improper dietary habits, lack of physical activity, ill effects of urbanization due to migrations, psychosocial stress all contribute to a greater risk of developing premature MI in Indians. The seriousness of coronary artery disease is heightened by the fact that approximately a third of patients present with sudden death as their research which investigates inciting events, or “triggers”, of MI, arrhythmias, and sudden death. The documentation of circadian variation in the incidence of acute myocardial infarction indicated that the onset of infarction is not a random event but such studies provided a basis for the study of the triggering mechanism. The Triggers

and Mechanisms of Myocardial Infarction Study was designed to determine the frequency and importance of physical activity and other external stimuli associated with the transition from chronic coronary artery disease to acute nonfatal myocardial infarction. [9]

Objective

To assess the precipitating factors for the onset of myocardial infarction among 18-45 yrs patients admitted in selected teaching hospital of Mumbai.

MATERIALS AND METHODS

A cross sectional exploratory survey approach was used. The study was conducted in teaching hospitals of Mumbai, Maharashtra, India from July 2016 to July 2017. Total 100 cases were selected for the study using purposive sampling. Permission from the respective authorities and Ethical committee approval was obtained prior to study. Written informed consent from study subjects was obtained. To assess the precipitating factors semi-structured questionnaire were used and data analyzed using descriptive and inferential statistics.

RESULTS

From July 2016 to August 2017 a total of 100 patients were enrolled in the study and completed the interview 2-3 days after their first episode of MI. All the patients admitted in the hospital during this period with documented MI, eligible patients were selected as per the study inclusion criteria. Patients were selected after the informed consent in the study. Out of 100 patients majority of sample in the age group or 36-45 yrs, were 73% as compared to 18-35 yrs were 27%. (mean age was 37.96). Males were 90% where as female with myocardial infarction were only 10%. Out of all sample 86% were married and 14% were unmarried. With regard to education 85% of study subjects were completed their education upto high school level and rest others (14%) were educated graduation and above level. Upto 67% were having family income of \leq 16077 and 33%

were in the income group of ≥ 16078 to ≤ 42876 . As per the occupation of the participants, unskilled 25%, semiskilled 21%, skilled 32%, clerical/ shop owner 10%, semiprofessionals were 7% and professionals were only 5%. As per the Kuppaswamy Socio-Economic scale, 1% only in upper class, upper middle 23%, lower middle 20% and majority belongs to upper middle class i.e. 56%. Out of 100 patients, 91% were having typical chest pain. Among 100 patients only 8% were able to reach the hospital before 1 hour from the onset of chest pain. (The mean time was 333.90 minutes). Patients diagnosed on the basis of ECG findings were NSTEMI 6%, AAMI 69%, IWMI 18%, ALWMI 2%, ASWMI 5%. Patient's coronary angiography findings revealed that 83% were having single vessel disease, 6% double vessel disease and 5% multi-vessel disease and 6% normal coronary angiography. Among the subjects only 8% were performing moderate to vigorous physical activity prior to onset of chest pain. At the time of onset of chest pain majority 59% at home, 21% at workplace, 2% were travelling and other 18% were at places like market and playground etc. Among the study subjects 48% were consuming tobacco prior to onset of chest pain and only 15% were consuming alcohol prior to onset of chest pain. Majority of the study participants have used taxi (49%), auto (12%), ambulance (11%), bike(8%), train (7%), private car (4%), rest others have used multiple kind of vehicles and one patient was already in the hospital premises with the other relative admitted and doing admission process. Various stressors experienced by the patients with myocardial infarction were job related stressors (10%), family related stressors (10%), oily food related stressors (3%), finance related stressors (5%), health related stressors (4%) and 66% didn't experienced any kind of stressors and 2% other stressors.

Table 1. Distribution of sample in relation to their demographic variables n=100

Age (yrs)	f	%
18-30	10	10
31-35	17	17
36-40	39	39
41-45	34	34
Gender		
Male	90	90
Female	10	10
Marital status		
Unmarried	14	14
Married	86	86
Education		
Illiterate	9	9
Primary school	9	9
Middle school	47	47
High school	20	20
Intermediate /post high school diploma	1	1
Graduate/ postgraduate	13	13
Professional honors	1	1
Family income		
≤ 2164	1	1
2165 – 6430	13	13
6431 - 10718	28	28
10719 – 16077	25	25
16078 – 21437	14	14
21438 – 42875	15	15
≥ 42876	4	4
Occupation		
Unemployed	0	0
Unskilled worker	25	25
Semiskilled	21	21
Skilled	32	32
Clerical/shop owner/farmer	10	10
Semiprofessional	7	7
Professional	5	5
Socio-economic status		
Upper class	1	1
Upper middle	23	23
Lower middle	20	20
Upper lower	56	56
Lower class	0	0
		n = 100

As per the table 1 the age group were 18-30 (10%), 31-35(17%), 36-40 (39%), 41-45(34%), i.e. majority of sample lies in the age group of 36-45 yrs. Majority of the study participants were males (90%), as compare to females (10%). Among the study subjects illiterate (9%), primary schooling (9%), middle schooling (47%), high school (20%), intermediate (1%), graduate & postgraduate (13%) and professional honors were only 1% This suggest that majority of the participants had at least education upto middle school In the occupation of the subjects professionals (5%), semiprofessionals (7%), clerical, shop owners and farmer (10%), skilled (32%),semiskilled (21%), unskilled (25%) which suggest that majority sample were skilled workers. Family income suggests that majority of the study participants had

family income <16000 per month. As per the socio-economic status of the subjects upper class 1%, upper middle class 23%, lower middle class 20%, upper lower class 56%, lower class 0% which suggest that majority of sample belongs to upper lower class.

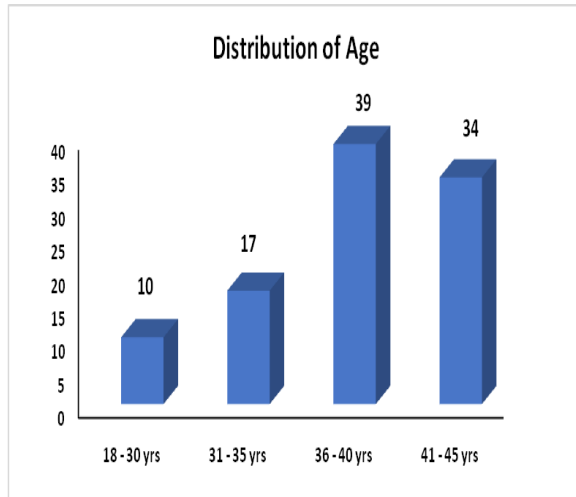


Figure1. Distribution of sample in relation to age

Out of 100 patients, 91% were having typical chest pain. 8% were able to reach hospital before 1 hour from the onset of chest pain (mean time was 333.90 minutes). On the basis of ECG findings

NSTEMI 6%, AWTMI 69%, IWMI 18%, antero-lateral wall MI 2%. Total 83% were having single vessel disease, 6% double vessel disease, 5% multi-vessel disease & 6% with normal coronary angiography

Table2. Type of chest pain among 18-45yrs patients admitted with myocardial infarction n=100

Type	freq	percentage
Typical	91	91
Atypical	9	9
Total	100	100

Time taken to reach hospital from the onset of chest pain

Time (hr)	f	%
<1h	21	21
1-2hrs	14	14
2-6hrs	36	36
>6hrs	29	29
Diagnosis		
NSTEMI	6	6
AWMI	69	69
IWMI	18	18
Antero-lateral MI	2	2
Antero-septal MI	5	5
Total	100	100
Angiography findings		
Single vessel	83	83
Double vessel	6	6
Multi-vessel	5	5
Normal	6	6
Total	100	100
n=100		

Table 3 Distribution of sample in relation to their time of onset of MI n=100

Gender	Time of onset of MI				Total	p-value 0.033 Chi-square = 8.757
	6am-12 N	12N-6pm	6pm -12mn	12mn -6am		
Male	32(35.6%)	25 (27.8%)	21 (23.3%)	12 (13.3%)	90	
Female	0	2 (20%)	4 (40%)	4(40%)	10	
Total	32	27	25	16	100	

Males had MI especially during 6am to 6pm (63.4%) as compared to females (80%) from 6pm to 6am and this association is statistically significant (p<0.05, chi square 8.757).

Table 4 Distribution of sample in relation to their activities performed prior to onset of MI n=100

	Type of activity					Total	p-value 0.007 Chi square = 13.988
	sleeping	Sitting/resting/ watching TV	Talking /arguing	working	Playing/ defecating		
Male	24 (26.7%)	32 (35.6%)	16 (17.8%)	11 (12.2%)	7 (7.8%)	90 (100%)	
Female	4 (40%)	0 (0%)	0 (0%)	5 (50%)	1 (10%)	10 (10%)	
Total	28 (28%)	32 (32%)	16 (16%)	16 (16%)	8 (8%)	100 (100%)	

Among all the subjects 24% were performing moderate to vigorous physical activities prior to onset of chest pain and males were more active than females (chi square 13.988, p<0.05).

Table 5 Distribution of sample in relation to their location at the time of onset of MI n=100

	Location at the time of onset of chest pain				Total	p-value 0.052 Chi square = 7.731
	Home	Workplace	Travelling	Playground/market		
Male	49 (54.4%)	21 (23.3%)	2 (2.2%)	18 (20%)	90 (100%)	
Female	10 (100%)	0 (0%)	0 (0%)	0 (0%)	10 (100%)	
Total	59 (59%)	21 (21%)	2 (2%)	18 (18%)	100 (100%)	

At the time of onset of chest pain majority 59% at home, 21% at workplace, 2% were travelling and other 18% were at places like market and playground etc.

Table 6. Distribution of sample in relation to their tobacco consumption of tobacco before the onset of MI n =100

Age	Tobacco prior to onset of MI		Total	P-value 0.581 Chi square = 0.986
	Yes	No		
<35yrs	13 (48.1%)	14 (51.9%)	27 (100%)	
>36yrs	35 (47.9%)	38 (52.1%)	73 (100%)	
Total	48 (48%)	52 (52%)	100 (100%)	

Table 7 Distribution of sample in relation to alcohol consumption prior to onset of MI n=100

Age	Alcohol prior to onset of MI		Total	P-value 0.179 Chi square = 0.219
	Yes	No		
<35yrs	6 (22.2%)	21 (77.8%)	27 (100%)	
>36yrs	9 (12.3%)	64(87.7%)	73 (100%)	
Total	15 (15%)	85 (85%)	100 (100%)	

Table 6 and 7 depicts that, among the study subjects 48% were consuming tobacco prior to onset of chest pain and only 15% were consuming alcohol prior to onset of chest pain.

Table no. 8 Stressor precipitating MI reported by patients n=100

Types of stressors	freq	percentage
Job related	10	10
Family related	10	10
Food related	3	3
Finance related	5	5
Health related	4	4
Total	100	100

Table no.8 depicts various stressors experienced by the patients with myocardial infarction were job related stressors (10%), family related stressors (10%), oily food related stressors (3%), finance related stressors (5%), health related stressors (4%) and 66% didn't experienced any kind of stressors and 2% other stressors.

Table no.9 Transport used at the time of chest pain to reach hospital

Transport	freq	%
Auto	12	12
Bike	8	8
Private car	4	4
Taxi	49	49
Train	7	7
Bus	3	3
Ambulance	11	11
Auto ,taxi and train	1	1
Auto, taxi	2	2
walking	1	1
Walking , train	1	1
Already in hospital	1	1
Total	100	100

Table no.9 illustrates that majority of sample (49%) preferred taxi to reach the

hospital at the time of onset of chest pain, followed by auto (12%), and ambulance (11%).

DISCUSSION

An increase risk of acute myocardial infarction is associated with certain forms of activities, such as strenuous physical activity as 3 patients were playing cricket prior to onset of MI but the results are not consistent with another study which is one of the first studies was from the Netherlands, [10] in which mortality from coronary heart disease and stroke was found to be increased in men on the day of an important football match between the Netherlands and France in the 1996 European football championship tournament. Smoking is also associates with onset of MI which is supported by the study done by Gabbay FH et al [4] Onset of MI time is also observed between 6am to 12noon (36) and the results are consistent with Muller JE that the morning increase in events begins after subjects assume an upright posture and start the day's activities, during a time of sympathetic nervous system activation. [3] Onset of MI is also linked with stressors.15 patients were consuming alcohol prior to onset of MI and there are similar results in a study done by Elizabeth Mostofsky et al. and concluded that, consumption of beer, wine or liquor is associated with a higher risk of acute MI in the following hour and the following 24 hours. [11] Several case-control and prospective studies have found that for a

given level of total alcohol consumption, people who drink in binges rather than regularly tend to have higher rates of CHD [12] Every second heart attack patient in India takes more than 400 minutes to reach a hospital, which is almost 13 times more than the ideal window of 30 minutes, government data shows. A two-year data from the ongoing Management of Acute Coronary Event (MACE) Registry of the Indian Council of Medical Research (ICMR) shows at some places it even takes 900 minutes as a lot of time is wasted in transportation. This data seems to be consistent with the current study findings of mean time to reach the hospital 333.90 minutes [13] with three million cases every year, heart attack may be the commonest grave ailment in India. But Indians seem to be dimly aware of its calling card-be it the sudden pain in the chest, upper back or jaw-and often don't react appropriately. A shocking 95% of heart attack patients take public transport to reach hospital. And, many of them reach after six hours-or over 380 minutes-of the first symptoms, found an all-India study and 10% of heart attack patients in the city reach the hospital within the golden hour these findings are quiet similar to current study that 96% patients used public transport to reach hospital at the time of MI and 21% patients reached to hospital within the golden hour. [14] Almost 88 percent of patients who arrived during regular weekday hours were treated with angioplasty within the American Heart Association's recommended 90 minute goal versus 79 percent for those who arrived during off hours. These results are not consistent with the current findings as 84% patients reached to hospital during day time and only 16% reached during off hours. [15]

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