

## ORIGINAL ARTICLE

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## ASSOCIATION OF PSYCHOSOCIAL FACTORS WITH ANXIETY AND DEPRESSION IN PATIENTS FOLLOWING ACUTE MYOCARDIAL INFARCTION

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## ABSTRACT

**Background:** Anxiety and depression are proven independent predictors of mortality, disability, and reduced health related quality of life (HRQoL). Hence, this study was undertaken with aim to find the prevalence of anxiety and depression in patients following acute myocardial infarction (AMI) and to find out its association with various psychosocial factors.

**Methods:** Stable patients admitted during 3 month period in Cardiology Intensive care unit of tertiary care Hospital with the diagnosis of acute myocardial infarction were included in this cross sectional study. Data was collected using a Semi- structured questionnaire. Anxiety and depression were assessed using Hospital Anxiety and Depression Scale (HADS) .Scores were analyzed using SPSS version 16.

**Results:** A total of 75 patients (73.3% men and 26.7% women) with mean age  $54.86 \pm 9.91$  years were included. Mean scores of anxiety and depression were 4.49 and 4.0 out of 21, respectively. Probable cases of anxiety and depression as per HADS were 29.33% and 21.33% respectively. There was a statistically significant association of Anxiety and depression with gender ( $P = 0.004(A)$ ,  $P = 0.002(D)$ ); education [ $P = 0.018(A)$ ,  $P = 0.002 (D)$ ]; and pre-existing known stressor [ $P = <0.001 (A)$  and  $P = 0.002(D)$ ]. The association of anxiety and depression with age, addiction, presence of co-morbidities and previous history of AMI / stroke was not statistically significant.

**Conclusion:** Anxiety and depression are common after AMI. It was seen more in females, low literacy and those with pre-existing known cause of stress (stressor). Hence, psychological screening should be incorporated in routine assessment in patients with AMI during hospitalization to plan early intervention that could potentially improve recovery pattern.

**Keywords:** Anxiety, Depression, Acute myocardial infarction, HADS, psychological screening, gender

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## INTRODUCTION

Cardiovascular disease (CVD) has emerged as a global burden in last few decades and is major cause of death and disability worldwide. CVD is growing in India at an alarming rate with the current prevalence of 11% and including young as well as adult population of all the socioeconomic strata causing 52% CVD death below 70 years as compared to 23% in western countries.<sup>1</sup>

Fear of death, uncertainties related to life and emotional & financial consequences arising after the episode may lead to symptoms of anxiety and depression in patients as well as their family members.

In a meta analysis by Meijer A. et.al. in 2011, proportion of patients with major depression or patients scoring above the cutoff of self-rating instruments ranged from 5 to 69% (average 28%). The average percentage of all-cause mortality was 9% (range, 2%–21%); cardiac mortality, 5% (0.5%–10%) and cardiac events, 21% (range, 5%–47%).<sup>2</sup> The difference the study protocol, screening tool for anxiety and depression and different population accounts for the difference in the prevalence. The presence of depression confers significant risks for additional cardiac morbidity and mortality in patients with coronary heart disease.<sup>3,4</sup> It increases hospital length of stay, procedures, readmission rates<sup>5</sup>, and the cost of medical care.<sup>6</sup> It is associated with an increased risk of re-infarction.<sup>7,8</sup> It is known to be an independent risk factor for death after AMI.<sup>9,10</sup> Depression, even after adjustment for potential confounders has been associated with significant worsening of quality of life in cardiac patients.<sup>11</sup> It predicts slow recovery and a poor quality of life following AMI.<sup>12</sup>

Patients with acute coronary syndrome (ACS) (myocardial infarction or unstable angina) who report even subsyndromal levels of depressive symptoms are at increased risk of ACS recurrence or mortality.<sup>13,14</sup> Compared with patients who are not depressed, patients who are depressed are significantly less likely to adhere to prescribed medications, follow lifestyle recommendations (example: smoking cessation, exercise), practice self-management (example: monitor weight and adjust diuretics in heart failure), and even follow up or receive recommended cardiac testing.<sup>15, 16</sup> There is relatively less work done on this topic in India. Hence, this study was undertaken with the primary objective to find out the prevalence of Anxiety and depression in patients diagnosed with

acute myocardial infarction (including acute coronary syndrome) in the Cardiac ICU of the tertiary care hospital in Mumbai. Secondary objective was to find out if there is any association of anxiety and depression with their gender, education, pre-existing stressor, co-morbidities and addiction.

## METHODOLOGY

The study was conducted in a tertiary care hospital. After obtaining approval from departmental review board all the consecutive patients of both genders diagnosed with acute myocardial infarction or acute coronary syndrome admitted in the ICCU were screened. Patients with unstable vital parameters (Heart rate, respiratory rate and blood pressure) and those having concomitant presence of Rheumatic heart disease, congenital heart disease, and heart block were excluded. After explaining the nature and purpose of the study, consent was sought from patients who agreed to participate in the study. Data was collected for duration of 3 months.

Patients were assessed in the intensive coronary care unit where they are kept for expert management of MI following emergency room care. The average duration of stay was between 5-10 days. All eligible and consenting patients were administered a semi structured interview designed to gain relevant information regarding socio-demographic and clinical history including details of the recent AMI. All relevant documents were analyzed. The subjects then completed answering Hospital Anxiety and Depression Rating Scale (HADS) a four point 14 item questionnaire. It has been found to be a reliable and valid instrument for detecting states of depression and anxiety in hospital settings in patients with AMI.<sup>17,18,19,20</sup> HADS has two subsets of seven items each for anxiety and depression with cut-off score of >8 used to diagnose probable cases of anxiety and depression respectively.<sup>21</sup>

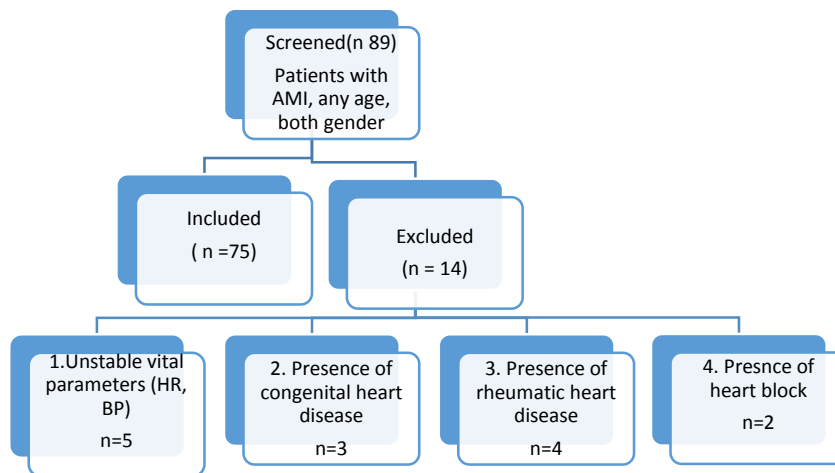
The interview and administration of HADS questionnaire was done in a standardized method by a single trained therapist. It was completed in one session lasting for 15-20 minutes.

### Statistical Analysis

The results were analyzed using SPSS for windows; version 16.0. 'p value' of  $\leq 0.05$  was considered statistically significant. Mann Whitney, Kruskal wallis and chi square tests were applied to find out the association of anxiety and depression with various psychosocial variables as per needed.

**RESULTS**

**Figure 1:** Selection criteria



**Table 1:** Frequency of Demographic variables in males and females

VARIABLE	n		
	Male	Female	Total
n	55 (73.3%)	20 (26.7%)	75 (100%)
Age	54.75 ± 9.86 years	54.79 ± 9.82 years	54.867 years
Education level	Illiterate	4	7
	Std I- VII	20	10
	Std VIII-SSC	23	2
	≥HSC	8	1
Co-morbidities	Hypertension	20	8
	Diabetes	8	4
	Both	9	4
	None	18	4
Addiction	Smoking/Tobacco	21	3
	Alcohol	3	0
	Both	5	0
	none	26	17
Known stressor	16	10	26(34.67%)

**Table 2:** Frequency and mean values of anxiety and depression in males and females

	Male	Female	Total
Possible Anxious	n = 11	n = 11	22 (29.33%)
Possible Depressed	n = 7	n = 9	16 (21.33%)
Mean Anxiety score	3.71 ± 4.31	7.227 ± 4.88	4.49
Mean Depression score	2.92 ± 4.09	6.95 ± 5.021	4.0
Median Anxiety score			3
Median Depression score			3

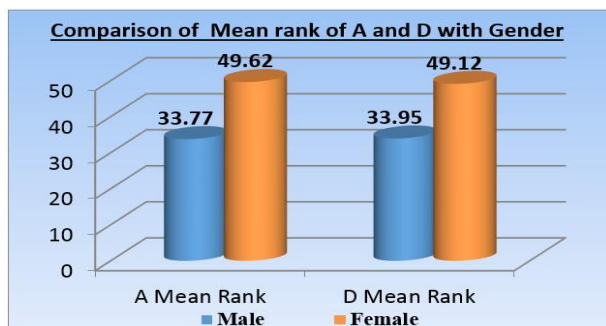
**TABLE 3:** Statistical tests to find association of variables with anxiety and depression

VARIABLE	STATISTICAL TEST	P VALUE (ANXIETY)	P VALUE (DEPRESSION)
Gender	Mann-Whitney	0.004 Significant	0.005 - Significant
Education	Kruskal Wallis	0.018 Significant	0.002 - Significant
Stressor *	Kruskal Wallis	<0.0001 Significant	0.002 Significant
Stressor**	Mann Whitney	N.S	N.S
Age	Chi Square	N.S	N.S
Co-morbidities	Kruskal Wallis	N.S.	N.S
Addiction	Chi square	N.S	N.S
Past history	Chi square	N.S	N.S

(N.S : Not significant, Stressor \* : history of 'no pre-existing stressor included in comparison; stressor\*\* : comparison between family and finance only , as the pre-existing stressor)

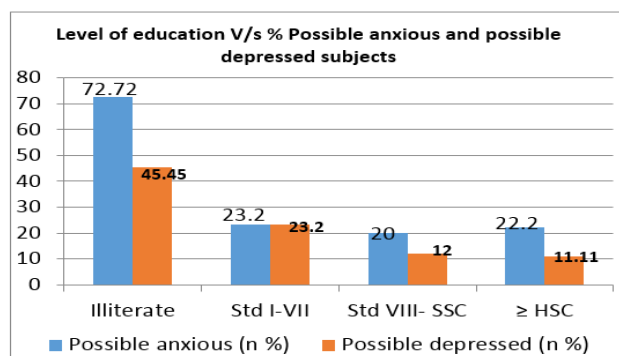
Figure (1) shows pattern of selection process followed in this study. 75 patients were included from the initial 89 patients that were screened. Out of total 75 subjects majority (73.3%) were males and as compared to 26.7 %females Frequency of demographic data has been summarized in table 1. 29.33% participants scored ≥ 8 on Anxiety subscale and 21.33 % participants scored ≥ 8 on depression subscale of HADS. Mean anxiety score was 4.49 (Male: 3.71; Females: 7.227) and mean depression score was found to be 4 (Males: 2.92; Females: 6.95). Median score of anxiety and depression was 3 each. Age ranged from 30 to 81 years. Thirty two patients were in the range of 45-60 years, seventeen below age 45years, and twenty six patients were above 60 years. Mean age of participants was 54.867 years (Table 2). Table 3 shows the summary of statistical analysis of the data.

**Graph 1 :** Comparison of mean rank of anxiety and depression with gender using Mann Whitney test.



Statistically significant association was found between mean rank of anxiety and depression with gender with 'p' value- 0.004 (Anxiety) and 'p' value -0.005 (depression). Mean rank of Anxiety and depression was higher in females as compared to males.

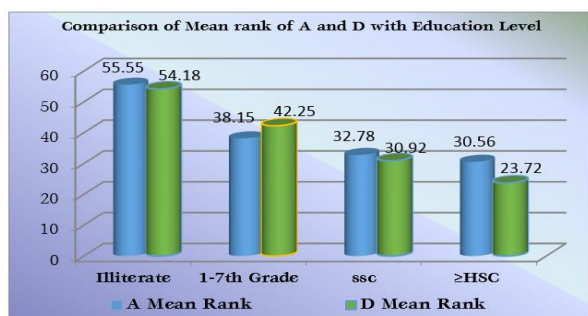
**Graph 2:** Level of education and frequency of Anxiety and depression



(\*Illiterate refers to the one who doesn't know reading and writing)

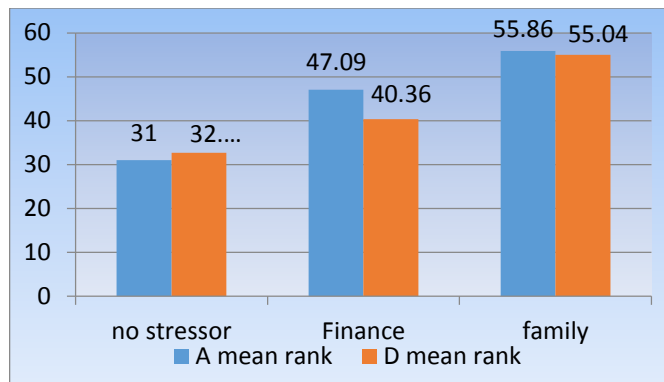
Anxiety and depression was found to be more prevalent in illiterate subjects (72.72% possible anxious and 45.45 % possible depressed) as compared to literate subjects (less than 25%)

**Graph 3:** Comparison of mean rank of anxiety and depression with Education level using Kruskal wallis test



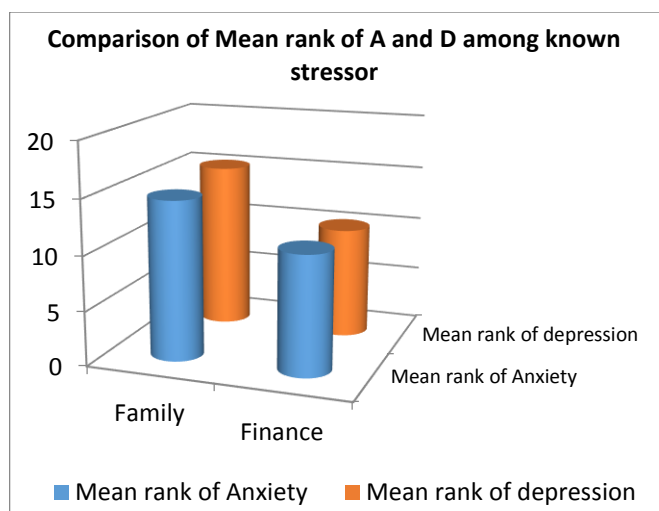
On comparing mean rank of anxiety and depression with Education level, 'p' value 0.018 for anxiety and 0.002 for depression was found which has statistically significant association with illiteracy.

**Graph 4:** Comparison of mean rank of anxiety and depression with stressor -before AMI using Kruskal Wallis test



Statistically significant ('p' value < 0.0001- Anxiety and 0.002 -depression) association of anxiety and depression with presence of stressors was seen.

**Graph 5:** Comparison of mean rank of anxiety and depression among stressors using Mann Whitney test



On comparing family v/s financial stress, the difference in the mean rank was not statistically significant

Graph 1 shows comparison of mean rank of anxiety and depression with gender which is higher for females i.e. 49.62 for anxiety and 49.12 for depression than males i.e. 33.77 and 33.95 respectively. Mann whitney test was applied and resultant p value was 0.004 for anxiety and 0.005 for depression showing significant association between the mean ranks.

Significant association of mean ranks of anxiety and depression with education level was observed. The significance was associated with higher mean rank of anxiety and depression in illiterate and less educated patients. With increasing order of education, the mean ranks decreased (Graphs 3) Its worth mentioning here that when mean ranks of anxiety and depression were compared with presence or absence of stressor, the finding was

statistically significant as patients with no pre-existing stressor had comparatively low mean rank of anxiety and depression than those with known stressor (Graph 4). However it was not statistically significant when compared amongst the causes viz. familial v/s financial (Graph 5) suggesting that the statistical significance was associated with the group not having pre-existing stress rather than due to a specific cause of stress (Table 3).

The association of mean rank of anxiety and depression was not statistically significant with age, co-morbidities, addictions and past history of MI, coronary artery bypass graft (CABG), or stroke (Table 3)

## DISCUSSION

The study was initiated with the aim to find out prevalence of anxiety and depression in patients following acute myocardial infarction, who are admitted in intensive care unit and to find out the association of anxiety and depression with various psychosocial factors. The sample consisted of more men (73.3%) as compared to women. It is known fact that male gender is a risk factor for CVD. Hence, this is justified. The mean age of subjects is 54.86 years which shows the trend of CVD occurring in adult age group and no more confined to elderly age group.

Our study showed prevalence of Anxiety (29.33%) and Depression (21.33%) which is in consistence with other studies carried out on these subject.<sup>22,23,24</sup> Some studies have reported wide diversities in prevalence of anxiety and depression in this population ranging from 5 to 69%. This diversity is based upon the difference in the instrument used for finding the prevalence from DSM IV criteria to validated questionnaires.

This study confirmed the findings of several studies that females are more anxious and depressed as compared to males after AMI.<sup>25,26,27</sup> A study done by Rutledge T. et. al. in 2009 shows, the joint effect of anxiety and depression symptoms predicted incidence of myocardial infarction, heart failure, stroke and death beyond individual symptom clusters among women.<sup>28</sup> Hence identification and treatment at earlier stages becomes very important.

Low educational status was reported as significantly associated with psychiatric morbidity in IHD.<sup>29,30,31,32</sup> In our study, we found the similar association. This could be related to more awareness and knowledge about the current trends in medical technology, treatment options available, problem solving with the help of health care worker, social media and internet. Moreover,

better ability to cope up with situation and acceptance of life style modification is more in educated patients. Patients with family and/or finance as the cause of stress (stressor) before occurrence of AMI showed more anxiety and depression post AMI than those without any stressor.

Out of 15 patients with history of myocardial infarction, CABG or stroke; 5 (33.3%) patients had anxiety and 6 (40%) had depression post AMI. This clearly suggests that the recurrence of the cardiac event is associated with less anxiety and depression possibly due to more awareness and learning strategies to cope up and patient education imparted during first episode. Although, the association was not statistically significant. The possible reason for this could be small sample size of the study.

Previous studies have found positive association of anxiety and depression with co morbidities like hypertension and diabetes<sup>33,34</sup> However, no such association was found in our study. Possible reason could be the effect of confounding factor in our study like higher education as most of the patients with co-morbidities were educated till at least SSC and higher.

Association of anxiety and depression was not found to be significant for age and addiction variables. In our study 13.79 % smokers were possibly depressed. It is seen that Smoking has an added contribution in mortality following AMI. Active smoking cessation program incorporated post AMI has shown to reduce mortality in depressed patients. However, depression following AMI makes it difficult for them to quit smoking. Cognitive behavioral therapy has shown to be helpful in depression as well as reduced smoking behavior post AMI.<sup>35,36</sup>

Researchers have shown that emotional states like depression, if experienced early and while in the coronary unit can influence psychopathology displayed by patients later during the course of their recovery along with the immediate complications and mortality.<sup>37</sup>

In a retrospective study done by R. Milani et. al. in 2007 found that in patients following major coronary events, cardiac rehabilitation was associated with both reductions in depressive symptoms and the excess mortality associated with it. Moreover, only mild improvements in levels of fitness appeared to be needed to produce those benefits on depressive symptoms and its associated mortality.<sup>38</sup> Many other investigators have found beneficial effects of exercise training program on depression to be as effective as anti-depressive medication.<sup>39,40</sup> Hence, Enhanced depressive care

results in reduction in depressive symptoms, improved quality of life and promising improvement in the prognosis of coronary heart disease.<sup>41,42</sup>

## CONCLUSION

Symptoms of anxiety and depression are common in patients following AMI. It is more evident in females and in illiterate patients. Patients having first episode of AMI and those with known stressor are more anxious and depressed.

## Clinical Implication

This emphasizes increased need for routine screening for Anxiety and Depression in patients following acute myocardial infarction. Early Referral to cardiac rehabilitation program consisting of patient education, counseling, and exercise training may help to alleviate these symptoms.

## Limitations of The study

Due to the limited study duration, sample was small.

## Abbreviations:

AMI: Acute myocardial infarction

HADS: Hospital anxiety and depression scale

CABG: Coronary artery bypass grafting

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### ***Citation***

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