

# Association between Depression and Cardiovascular Risk Factors in Acute Myocardial Infarction

Sneha Susan Zacheria<sup>1</sup>, Mary Shalu Jose<sup>2</sup>, Stigi Joseph<sup>3</sup>

<sup>1</sup>Department of Physiology, Little Flower Institute of Medical Sciences and Research, Angamaly, Kerala, India

<sup>2</sup>Associate Professor and Head, Department of Physiology, Little Flower Institute of Medical Sciences and Research, Angamaly, Kerala, India

<sup>3</sup>Professor and Head, Department of Cardiology, Little Flower Hospital and Research Centre, Angamaly, Kerala, India

**Abstract:** ***Aim:** Find the Association between the degree of Depression and selected socio demographic variables. **Samples:** This observational descriptive study was conducted among 120 patients with Acute Myocardial Infarction. **Results:** There is an association between Depression and Cardiovascular risk factors. Significantly a higher level of Depression was observed in Male, Unmarried and Diabetic patients with Acute Myocardial Infarction. The levels of Education, Insurance, Hypertension and Obesity have not shown any association with Depression. **Conclusion:** Depression is more prevalent among unmarried males, recovered from AMI with a past history of Diabetes.*

**Keywords:** Depression, Acute Myocardial Infarction.

## 1. Introduction

Acute Myocardial Infarction (AMI) refers to a degree of myocardial ischemia due to interruption of blood supply that causes necrosis in the myocardium. Commonly, AMI occurs when partially occluded coronary artery is constricted further by vasospasm or plaque, which triggers formation of thrombus and occludes coronary artery<sup>(1)</sup>. Depression is a prevalent, debilitating, and under diagnosed condition that affects approximately 20% of patients with recent myocardial infarction (MI), and is associated with increased risk of recurrent cardiac events<sup>(2)</sup>. A potential mediator of their poor outcomes might be depressive symptoms, which occur in  $\approx 1$  of every 3 patients with AMI<sup>(3)</sup> and have been shown to be associated with detrimental long-term outcomes.<sup>(4-6)</sup> Moreover, depression is associated with higher morbidity and mortality among AMI survivors.<sup>(7)</sup> A significant gap remains in the knowledge about the association between Depression and cardiovascular risk factors in AMI patients, independent of other risk factors.

## 2. Methodology

**Study Design:** Descriptive comparative design has been used for this study.

**Study Period:** This study was conducted in between February 2019 to June 2019.

**Study Setting:** The study was conducted at Department of Cardiology, Little Flower Hospital and Research Centre, Angamaly, Kerala, India.

**Population:** A total of 120 samples were included in this study.

**Sampling Technique:** Simple random sampling.

**Inclusion Criteria:** Male and Female patients with Acute Myocardial Infarction aged between 45 to 60 years of age, Willing participants, Patients not suffering with any other diseases or complications.

**Exclusion Criteria:** Unwilling participants, Known depression patients, those who on post menopausal hormone therapy.

**Methods of Data Collection:** Baseline characteristics of patients were assessed by the structured proforma.

### Outcome Measures

#### 9-item version of the Patient Health Questionnaire (PHQ-9)<sup>(8)</sup>

To assess the degree of Depression in patients with AMI.

### Statistical Analysis

Statistical analysis was performed using IBM SPSS version 20.0 software. To test the statistical significance of the association of categorical factors with PHQ score, Chi square test was used. Categorical variables are expressed using frequency and percentage. Continuous variables are presented by mean and standard deviation.

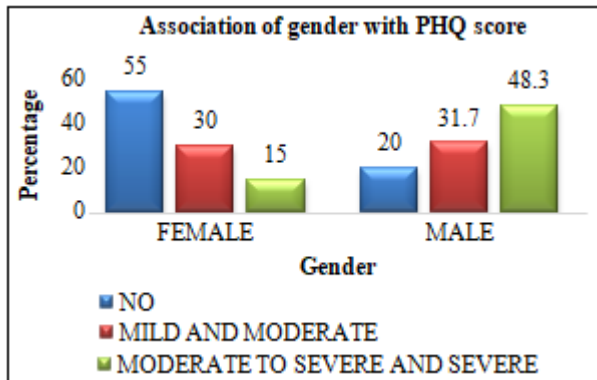
## 3. Results

This descriptive study included total 120 samples out of which 60 male and 60 females aged between 45-60 years. The mean age of the patient's was  $50.98 \pm 4.50$  years. Consider gender males are high in severe stage compared to females.

**Table 1:** Association of gender with PHQ score

Gender	PHQ score			P value
	No n(%)	Mild and Moderate n (%)	Moderate to Severe and Severe n(%)	
Female (60)	33(55.0)	18(30.0)	9(15.0)	<0.001
Male(60)	12(20.0)	19(31.7)	29(48.3)	

Table 1 shows the association between Gender and Severity of Depression. Among 60 patients who were males 29(48.3%) have PHQ score moderate to severe and severe compared to females, 9(15.0%). The results showed statistically significant association (p value <0.001).

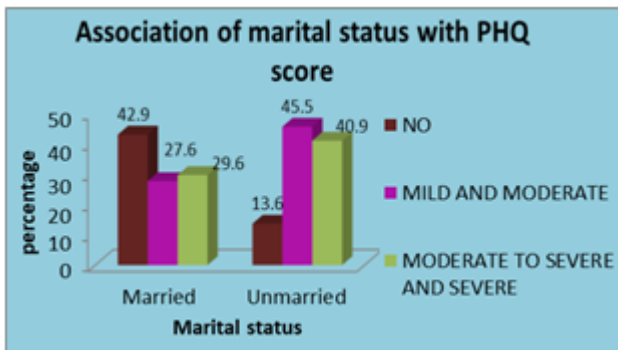


Graph 1: Association of gender with PHQ score

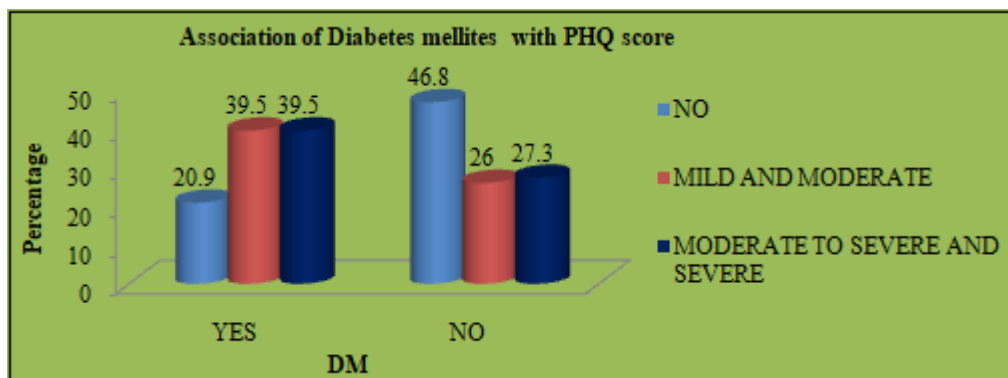
Table 2: Association of marital status with PHQ score

Marital Status	PHQ score			p value
	No n(%)	Mild and Moderate n (%)	Moderate to Severe and Severe n(%)	
Married (98)	42(42.9)	27(27.6)	29(29.6)	0.035
Unmarried(22)	3(13.6)	10(45.5)	9(40.9)	

Among 22 patients who were unmarried 9(40.9%) have PHQ score moderate to severe and severe compared to those who are married, 29 (29.6%). The results showed statistically significant association (p value =0.035).



Graph 2: Association of marital status with PHQ score



Graph 3: Association of Diabetes with PHQ score

Table 3: Association of Education status with PHQ score

Education	PHQ score			p value
	No n(%)	Mild and Moderate n (%)	Moderate to Severe and Severe n(%)	
High school (25)	12(48.0)	5(20.0)	8(32.0)	0.107
Less than high school (22)	3(13.6)	10(45.5)	9(40.9)	
More than high school (73)	30(41.1)	22(30.1)	21(28.8)	

The results showed education is statistically not associated with PHQ score

Table 4: Association of Insurance with PHQ score

Insurance	PHQ score			p value
	No n(%)	Mild and Moderate n (%)	Moderate to Severe and Severe n(%)	
Yes (54)	22 (40.7)	14 (25.9)	18 (33.3)	100
No (66)	23 (34.8)	23 (34.8)	20 (30.3)	

The results showed insurance is statistically not associated with PHQ score

Table 5: Association of Diabetes with PHQ score

DM	PHQ score			p value
	No n(%)	Mild and Moderate n (%)	Moderate to Severe and Severe n(%)	
Yes (43)	9 (20.9)	17 (39.5)	17 (39.5)	0.020
No (77)	36 (46.8)	20 (26.0)	21 (27.3)	

Among 43 patients who have diabetes, (17(39.5%) have PHQ score moderate to severe and severe compared to those who have not diabetes, 21(27.3%). The results showed statistically significant association (p value =0.020).

**Table 6:** Association of Hypertension with PHQ score

HTN	PHQ score			p value
	No n(%)	Mild and Moderate n (%)	Moderate to Severe and Severe n(%)	
Yes(67)	23(34.3)	24(35.8)	20(29.9)	0.409
No(53)	22(41.5)	13(24.5)	18(34)	

The results showed hypertension is statistically not associated with PHQ score.

**Table 7:** Association of Obesity with PHQ score

Obesity	PHQ score			p value
	No n(%)	Mild and Moderate n(%)	Moderate to Severe and Severe n (%)	
Yes(75)	24(32.0)	24(32.0)	27(36)	0.236
No(45)	21(46.7)	13(28.9)	11(24.4)	

The results showed obesity is statistically not associated with PHQ score.

#### 4. Discussion

This study was undertaken to analyze and find the association between depression and certain cardiovascular risk factors among Acute Myocardial Infarction survivors. Majority of the studies have evaluated the association between depression and potential cardiovascular risk factors (9-11).

A study done by Kim *et al.*, Depressive symptoms in younger women and men with acute myocardial infarction. Study enrolled 3572 patients with AMI. The results of the study suggest that Patients with more depressive symptoms had higher levels of stress and worse quality of life. Depressive symptoms were more prevalent among patients with lower socioeconomic profiles (e.g. lower education, uninsured) and with more cardiovascular risk factors (e.g. diabetes, smoking).<sup>(12)</sup>

In this study the cardio vascular parameters were evaluated with the degree of depression. The study examined the association of severity of depression with socio demographic factors such as gender and marital status, socio economic factors such as education and insurance, clinical profiles such as past history of Diabetes, Hypertension and Obesity. The study demonstrated Depression is more among unmarried males, recovered from AMI with a past history of Diabetes. The level of education, insurance, hypertension and obesity have not shown any association with Depression.

Prior studies have suggested that demographic characteristics can identify higher risk patients (eg, depressive symptoms are present in 40% of women aged ≤60 years, whereas 1 in 5

Men in that age group report having depressive symptoms)<sup>(4, 13)</sup> But this study shows that men (48.3%) have a higher rate of depressive symptoms than women(15.0%).this may be due to physiological factors such as presence of hormone oestrogen. Prior to menopause, women produce sufficient amounts of oestrogen, which decreases their heart attack risk significantly. After menopause, though, oestrogen levels fall,

and by age 60 to 65, men and women have approximately the same risk of developing heart disease.

Female sex hormones have been associated with a less atherogenic lipid profile and a more healthy fat distribution. Oestrogens prevent depression-like behaviour induced by HF post-MI in adult females by inhibiting pro inflammatory cytokine production and actions in the prefrontal cortex. In contrast to males, females with heart failure after myocardial infarction do not develop depression-like behaviour or increases in prefrontal cortex cytokines. However, after ovariectomy, females exhibit similar changes, which are prevented by 17β-estradiol replacement. Neuro inflammation in the prefrontal cortex in male subjects may contribute to depression-like behaviour, whereas its oestrogen-dependent absence in female subjects may protect against depression<sup>(14)</sup>.

Regarding life style, the prevalence of smoking is highest in men. Men are more physically active than women while women have healthier dietary habits. Since women are more prone to psychosocial distress their burden of disease is greater. Compared with a healthy population the relative risk of mi in a diabetic population is higher in women than in men. There is no significant difference exists in the prevalence of hypertension and obesity but it has an earlier onset in men.

Increased awareness and intensified treatment for coronary patients' depressive symptoms can be very beneficial. Similarly, the high stress scores noted in both men and women who had PHQ-9 scores ≥10 are modifiable and important treatment targets that are also associated with adverse cardiac disease outcomes.<sup>(15,16)</sup> Recently, several intervention studies have been shown to be helpful in reducing depressive symptoms and stress, improving patients' quality of life, and rendering promising results with regard to patients' cardiovascular prognosis.<sup>(17-19)</sup>

#### 5. Conclusion

The current study indicates Depression is more among unmarried males, recovered from AMI with a past history of Diabetes. The level of education, insurance, hypertension and obesity have not shown any association with Depression. Further studies in large populations could be used to understand the association between depressive symptoms with socio-demographic and clinical parameters. This information will be useful to target future prevention and intervention programs that can help address Depression as an important cardiac risk factor in this vulnerable group of patients.

#### 6. Conflicts of Interest

There are no conflicts of interest.

#### 7. Acknowledgement

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