

**ROLE OF SOCIAL SUPPORT IN DEPRESSIVE SYMPTOMS FOLLOWING  
MYOCARDIAL INFARCTION**Rownok Jahan<sup>1\*</sup>, Anisur Rahman<sup>2</sup>, Meerjady Sabrina Flora<sup>3</sup>, Ashiqur Rahman<sup>4</sup> and Mohammad Abdullah Al Manjur<sup>5</sup><sup>1</sup>MBBS, MPH (Epidemiology), Lecturer, Institute of Health Technology, Dhaka, Bangladesh.<sup>2</sup>Dhaka (Ex Professor and Head of Epidemiology, NIPSOM), Dhaka, Bangladesh.<sup>3</sup>MBBS, MPH, PhD (Additional Director General of DGHS), Dhaka, Bangladesh.<sup>4</sup>MBBS, MPH, Diploma in Tropical Medicine (CO, OKD 5, Bangladesh Military Contingent to Kuwait).<sup>5</sup>MBBS, Diploma in Cardiology (Asst Professor, Cardiology, City medical college, Khulna).**\*Corresponding Author: Dr. Rownok Jahan**

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Article Received on 16/10/2021

Article Revised on 06/11/2021

Article Accepted on 26/11/2021

**ABSTRACT**

**Background:** Major depression following myocardial infarction is generally persistent. Certain behaviors and social characteristics may also contribute to the progression of recovery of coronary disease. Little is known about the proportion of depressive symptoms and role of social support on depressive symptoms in our country. **Aims:** Assessing the role of social support in depressive symptoms following six weeks from acute myocardial infarction. **Materials and Methods:** A cross sectional study was carried out among purposively selected 158 myocardial infarction patients from four hospitals in Bangladesh. Social support was measured by 5 emotional social support scales from the Enhancing Recovery in Coronary Heart Disease (ENRICH). Depressive symptoms were measured by the 9-item Primary Care Evaluation of Mental Disorders Patients Health Questionnaire (PHQ-9). **Results:** Proportion of mild or no depression was 56.3%, whereas major or moderately severe depression was 43.7% among respondents and proportion of low social support was 80.4%, whereas moderate social support was 19.6% and no respondent found with high social support which was unlikely to our country prospect. Duration of myocardial infarction was correlated with depressive symptoms score ( $r=-0.175$ ,  $p=0.027$ ) & was not correlated with social support score. Major depressive symptoms were greater among women ( $p<0.001$ ), age above 60 ( $p<0.001$ ), single respondents ( $p<0.001$ ) and those having low social support ( $p=0.001$ ). Depressive symptoms scores were higher among recurrent myocardial infarction ( $p<0.001$ ) and low social support ( $p<0.001$ ) patient. **Conclusion:** This relationship between social support and depressive symptoms projects that depression always be taken into consideration for effective management and compliance of post myocardial infarction patient.

**KEYWORDS:** Depression, Social support, Depressive symptoms, Myocardial infarction.**INTRODUCTION**

Myocardial infarction is being increasingly recognized as a global public health problem and frequently it is associated with depressive symptoms. A good deal of research has documented high mortality rates in cardiac patients who are socially isolated.<sup>[3,7]</sup> One possible explanation is the association between social support and depression, because depression has been shown to increase mortality in cardiac patients and social support has been shown to predict improvements in depressive symptoms.<sup>[2,5]</sup>

Major depression following MI is common and persistent. Symptoms of depression can exacerbate or improve, but the prevalence rate of depression seems to be rather constant at least within the first 18 months following MI.<sup>[13]</sup>

In Bangladesh depression is an important illness and prompt identification and treatment of depression in the post-AMI period is strongly indicated for all patients, regardless of their age or sex, to ensure their appropriate clinical management. This is even true for post MI patient, improvement of social support can influence post MI depressive symptoms and thus decrease most MI morbidity and mortality along with clinical management and limit the burden of the disease. Depression and lack of social support are associated but conceptually distinct conditions. Depression is a clinical disorder, a prolonged state of sadness. Social support, especially emotional support, refers to the sense of being cared for, loved and esteemed, and the presence of intimate relationships. Although depression and lack of social support are correlated, evidence suggests that each individually predicts death among patients with CHD.

## MATERIALS AND METHODS

A cross sectional study was carried out among 158 post MI respondents by purposive sampling to assess social support, depressive symptoms and role of social support in depressive symptoms following myocardial infarction with socio-demographic characteristics other attributes. The study was conducted among patients with myocardial infarction at least six weeks from index MI attending in cardiovascular outpatient department of four hospitals in Dhaka city from July to December in 2013. The participants were selected as: (a) Patient with acute myocardial infarction. (b) Those who were diagnosed as MI patient attended at concerned hospitals following one and half months or more after myocardial infarction. (c) Age less than 75 years. (d) Those who were willing to participate in the study. The Exclusion Criteria includes: (a) Comorbid conditions to myocardial infarction, eg, Stroke, COPD, acute exacerbation of Bronchial asthma, CRF, acute left ventricular failure. (b) Patients who have diagnosed major psychiatric co-morbidity condition like schizophrenia, bipolar disorder or other psychiatric disorder.(c) The patients who are unable to participate.

**Study population:** All available cases of patients attended at the cardiac medicine and surgery outpatient department (OPD) of Bangabandhu Sheikh Mujib Medical University (BSMMU), National Institute of Cardiovascular Disease and Hospital (NICVD), a tertiary level government hospital being one of the largest specialized hospital for cardiac patient in Bangladesh, Ibrahim Cardiac Hospital and Research Institute and National Heart Foundation Hospital & Research Institute (NHFH&RI); where the patients reported for review and follow up at least one and half months after myocardial infarction. These referral renowned hospitals in Bangladesh were selected for availability of large number of MI patient with different socio-economic classes.

A pretested semi structured questionnaire in Bengali was used for data collection. Data were collected by face to face interview. No drug trial or invasive procedure was done in this study. All ethical issues were handled properly.

**Measurement of social support:** Social support was measured by the 5 emotional social support items from the Enhancing Recovery in Coronary Heart Disease (ENRICH) Social Support Inventory. Items were measured on 5-points scale and summed to create a

single score ranging from 5 to 25. Patient depressive symptoms were measured by the 9-item Primary Care Evaluation of Mental Disorders Patients Health Questionnaire (PHQ-9). This is calculated by assigning scores of 0, 1, 2, and 3, to the response categories of “not at all,” “several days,” “more than half the days,” and “nearly every day,” respectively. Items were measured on 4-point scales and summed to create a single score ranging from 0 to 27. The questionnaire was pre-tested with similar background who was not included in the study sample.

## RESULTS

This study was a descriptive type of cross sectional study. The study was carried out to assess role of social support in depressive symptoms among 158 patients following myocardial infarction.

### Socio-demographic characteristics of the respondents

Out of 158 respondents, 81 (51.3%) participants lived in nuclear family whereas 77 (48.7%) participants were in joint family. Nearly half of the participants had 5-6 family members; Average number of family member of respondents was 5.42 with standard deviation of  $\pm 1.621$ . Expenditure per person per day was classified as poor (<2 \$ or 154 taka), lower middle class (2-4 \$ or 154-308 taka), middle middle class (4-10 \$ or 308-770 taka), upper middle class (10-20 \$ or 770-1540 taka) and high class (>20 \$ or >1540 taka).

### Socio-demographic Characteristics and Social support

The study showed that the age limit of the respondents were from 32 to 75 years and Mean ( $\pm$ SD) were 55.33 ( $\pm 9.65$ ) years. There were mean difference of social support score between younger (below 60 years) and older (above 60 years) age group which was not statistically significant ( $t = -1.003$ ,  $p = 0.318$ ). The majority of the participants were married (85.4%). There were mean difference of social support between married (17.13) and single (12.65) respectively which was statistically significant ( $t = -5.557$ ,  $p < 0.001$ ).

Proportion of social support (moderate) were increased with the increased of economic class (middle to upper middle class 34.8%) and also decreased social support (low) with decreased economic class (poor 88.7%). The association between social support and socio-economic status were statistically significant ( $\chi^2 = 7.085$ ,  $p = 0.029$ ).

**Table 1: Socio-economic Status and Social support level of respondents.**

Characteristics	Social support level		$\chi^2$	p value
	Low SS	Moderate SS		
<b>Expenditure per person per day</b>				
Poor	63(88.7%)	8(11.3%)	$\chi^2 = 7.085$ OR=2.411(.946-6.145) OR=4.200(1.356-13.005)	0.029
Lower middle class	49 (76.6%)	15(23.4%)		
Middle middle class & Upper middle class	15(65.2%)	8(34.8%)		

### Treatment status following MI and social support score

One way ANOVA was done and statistically significant difference found between groups ( $F = 4.740$ ,  $p = 0.01$ ). Social support was statistically significantly associated with respondents who took medicine only, compared to PCI following MI ( $p = 0.048$ ). Statistically significant mean social support difference was found by t test between with angiogram (17.41) and without angiogram (15.42) during hospitalization ( $t = 3.184$ ,  $p = 0.002$ ).

### Recurrent MI and level of social support of respondents

To find out association between social support and morbidity of respondent, Chi-square test was done and revealed proportion of recurrent MI was higher (90.4%) in participants having low social support than participants experienced MI once in life (75.5%); whereas respondents having moderate social support had less experienced of recurrent MI than MI once in life ( $\chi^2 = 4.920$ ,  $p = 0.027$ ). Recurrent MI was 3 times less likely among respondents having moderate social support than low social support. (OR=0.327).

### Difficulty in Sleep and Social support score

Proportion of respondents faced difficulty in initiating sleep and waked up during sleep, both increased among those who had low social support. Social support was statistically significantly associated with difficulty in initiating sleep and waked up during sleep, separately.

### Sedatives and Social support

In this study most of the respondents (67.1%) had taken sedatives. Proportion of sedative taking habit was higher (91.5%) among respondents with low social support and these association was statistically significant ( $\chi^2 = 25.297$ ,  $p < 0.001$ ). Participants who had sedative taking habit had 8 times less likely to have moderate social support level than participant did not take sedatives. (OR=0.127)

### Number of close Friend and Social support

Number of close friend were positively correlated with social support score. That mean with the increased of number of close friend in regular contact, increased score of social support ( $r = 0.311$ ) which was statistically significant ( $p < 0.001$ ). This relationship were linear.

### Depressive symptoms score of respondents

Depressive symptoms were assessed by means of the 9-question Primary Care Evaluation of Mental Disorders Brief Patient Health Questionnaire (PHQ-9), Depressive symptoms score ranging from 0 to 27. Scores of 5, 10, 15, and 20 represent cut points for mild, moderate, moderately severe and severe depression and thus depressive symptoms were classified into four categories. Mean ( $\pm$  SD) score of depressive symptoms of respondents were  $8.86 \pm 4.824$  with lowest score being

1 and highest score was 18. Data was normally distributed.

### Socio-demographic Characteristics and Depressive symptoms

There were mean difference of depressive symptoms score between younger (below 60 years) and older (above 60 years) age group, which was statistically significant ( $t = -3.929$ ,  $p < 0.001$ ). The mean score of depressive symptoms between male and female were 7.88 and 11.24 respectively. These differences were statistically significant ( $t = -4.175$ ,  $p < 0.001$ ). The mean differences of depressive symptoms score between married respondents were 8.06 and single 13.57 respectively which was statistically significant ( $t = -6.499$ ,  $p < 0.001$ ).

Domicile status classified into rural, urban, semi-urban and slum area. Only one respondent resided in slum area which was included into urban area. With one way ANOVA, statistically significant difference found between groups ( $F(2, 155) = 3.830$ ,  $p = 0.024$ ). Hochberg GT-2 post-hoc revealed that depressive symptoms not statistically significantly associated with rural and urban ( $p = 0.059$ ), rural and semi-urban ( $p = 0.058$ ) and between urban and semi-urban ( $p = 0.984$ ).

### Comorbidity, medicine history and depressive symptoms

Depressive symptoms was statistically associated with Diabetes ( $t = 2.362$ ,  $p = 0.019$ ), taking Beta-blocker ( $t = 3.894$ ,  $p < 0.001$ ) and Insulin ( $t = 2.090$ ,  $p = 0.040$ ); but not with Hypertension, Hypercholesterolemia, taking Statin, Oral hypoglycemic agent,

### Menopause and depressive symptoms

Out of 46 female respondents, 41 (25.9%) experienced menopause and 5 (3.2%) were menstruating. There were mean difference of depressive symptoms between menopausal and menstruating women and this difference was statistically significant ( $t = -2.091$ ,  $p = 0.042$ ).

### Sedatives and Depressive symptoms

Mean of depressive symptoms between respondents took sedatives and respondents did not take sedatives were 9.75 and 7.04 respectively. This difference was statistically significant ( $t = -3.439$ ,  $p = 0.001$ ). Specifically Similar significant difference was found with bromazepam ( $t = -4.380$ ,  $p < 0.001$ ) and clonazepam ( $t = 2.216$ ,  $p = 0.033$ ) but not with diazepam and alprazolam.

### Recurrent MI and depressive symptoms

Mean of depressive symptoms between respondents experienced MI more than once and respondents experienced MI once were 11.25 and 7.69 respectively. This difference was statistically significant. ( $t = -4.637$ ,  $p < 0.001$ )

**Table 2: Age group, sex, marital status, Domicile, Menopause, Sedatives, Recurrent MI and depressive symptoms.**

Characteristics		Depressive symptoms mean ±SD	t test	p value
<b>Age</b>				
Below 60 years		7.67±4.415	-3.929	<0.001
Above 60 years		10.61±4.898		
<b>Sex</b>				
Male		7.88 ±4.622	-4.175	<0.001
Female		11.24±4.508		
<b>Marital status</b>				
Married		8.06 ±4.548	-6.499	< 0.001
Single		13.57 ±3.603		
<b>Domicile status</b>				
Rural		10.20±4.755	3.830	0.024
Urban		8.18±4.984		
Semi-urban		7.86±4.263		
<b>Menopause</b>				
No		7.40 ±5.727	-2.091	0.042
Yes		11.71 ±4.185		
<b>History of sedatives taking</b>				
No		7.04 ±5.002	-3.439	0.001
Yes		9.75 ±4.493		
<b>Category of Sedatives</b>				
Diazepam	No	8.77 ±4.778	-0.828	0.409
	Yes	9.92 ±5.392		
Alprazolam	No	8.85 ±4.791	-0.291	0.771
	Yes	9.67 ±7.638		
Bromazepam	No	7.48 ±4.872	-4.380	<0.001
	Yes	10.69 ±4.126		
Clonazepam	No	9.18 ±4.880	2.216	.033
	Yes	7.08 ±4.149		
Recurrent MI	No	7.69 ±4.441	-4.637	<0.001
	Yes	11.25 ±4.727		

**Economic status of Respondents and Depressive symptoms of respondents**

Proportion of level of depression increased (moderately severe, severe depression) with decreased of hierarchy level of economic classes (among severe depressed respondents poor were 12.7%, lower middle class 7.8 %, middle middle and upper middle class together 8.7%) and among mild depressed respondents economic classes increased from poor to upper middle class. These association was statistically significant by Pearson's chi-square ( $\chi^2 = 18.629$ ,  $p = 0.005$ ).

**Family type of Respondents and Depressive symptoms of respondents**

Proportion of moderately severe and severe depression was higher in joint family (36.4%, 18.2% respectively) than in nuclear family (24.7%, 2.5% respectively) and mild depression was less in joint family (20.8%) than in nuclear family (37.0%). Pearson's chi-square revealed these association was statistically significant ( $\chi^2 = 16.587$ ,  $p = 0.001$ ).

**Table 3: Economic status, family Type and Depressive symptoms.**

Characteristics	Depressive symptoms level				$\chi^2$	p value
	Mild	Moderate	Moderately severe	Severe depression		
<b>Economic status (Expenditure per person per day)</b>						
Poor	12(16.9%)	20(28.2%)	30(42.3%)	9(12.7%)	18.629	0.005
Lower middle class	21(32.8%)	23(35.9%)	15(23.4%)	5(7.8%)		

Middle middle& upper middle class	13(56.5%)	5(21.7%)	3(13.0%)	2(8.7%)		
<b>Type of family</b>						
Nuclear family	30(37.0%)	29(35.8%)	20(24.7%)	2(2.5%)	16.587	0.001
Joint family	16(20.8%)	19(24.7%)	28(36.4%)	14(18.2%)		

**Sleep and Depressive symptoms of respondents**

Depressive symptoms were negatively correlated with sleeping hours per night. That means depressive symptoms increased with the decreased of sleeping hours and vice versa. (r=-0.407, p<0.001) This relationship was cubic. One way ANOVA was done; and statistically significant difference was found between groups of difficulty in initiating sleep, (F (2, 155) =16.915, p=<0.001).

**Treatment status following MI, history of Angiogram and Depressive symptoms of respondent**

There was statistically significant difference in depressive symptoms between groups which determined by one way ANOVA. (F (2, 155) =10.803, p=<0.001). Depressive symptoms was statistically significantly associated in respondents took only medicine compared to PCI (p=<0.001).

**Number of close friends, close Relative and Depressive symptoms**

Depressive symptoms were positively moderately correlated with number of close friend. That means

depressive symptoms increased with the increased number of close friends and vice versa. (r=-0.480, p<0.001) This relationship was cubic.

Depressive symptoms were negatively weakly correlated with number of close relatives. That means depressive symptoms increased with the decreased number of close relatives and vice versa. (r=-0.165, p=0.038) This relationship was linear.

**Logistic regression model showing the role of social support in depressive symptoms following MI after controlling for other variables**

Binary logistic regression analyses were constructed to determine whether there was any role of social support in depressive symptoms after adjustment of socio-demographic variables, life style measures, illness characteristics and medicine. The model containing all variables was statistically significant ( $\chi^2$  =121.643, p <0.001). The overall model could explain 53.7% to 72% of the variation of depressive symptoms and classify 87.3% correctly.

**Table 4: Logistic regression model showing the role of social support in depressive symptoms following MI after controlling for other variables.**

Variable	$\chi^2$	P	Adjusted OR	95% CI
<b>Age</b>				
Low SS*	0.450	0.502	1.794	.326-9.883
Moderate SS				
<b>Marital status</b>				
Low SS*	0.286	0.593	4.380	.019-986.241
Moderate SS				
<b>Family type</b>				
Low SS*	1.338	0.247	0.386	077-1.939
Moderate SS				
<b>Number of close friend</b>				
Low SS*	8.193	.004	49.494	3.421-716.003
Moderate SS				
<b>Sedatives</b>				
Low SS*	0.394	0.530	0.467	0.043-5.036
Moderate SS				
<b>Angiography</b>				
Low SS*	1.028	0.311	0.381	0.059-2.461
Moderate SS				
<b>Recurrent MI</b>				
Low SS*	4.719	0.030	5.243	1.176-23.375
Moderate SS				

\* Reference group

## DISCUSSION

Depression is about three times more common in patient having suffered MI than in general community. Assessments in the hospital shows that one in five patients with MI has depression.<sup>[15]</sup> Less is known about the proportion of depressive symptoms in outpatient department and the role of social support on depressive symptoms in our country.

Most of the respondents resided in urban area (38.6%), then in rural, semi-urban and least lived in slum area. Earlier study also showed similar result with depression in India.<sup>[1]</sup>

Those with low social support were poor and had PHQ depressive symptoms score 10 or more or had major depressive symptoms. Similar study found unmarried status, lower social support and more unfavorable socioeconomic indicators were associated with depression defined as a PHQ  $\geq 10$ .<sup>[16]</sup>

In this study data were collected on few variables related to sleep. Sleeping hours of respondents were from 2 to 9 hours with mean ( $\pm$  SD)  $4.66 \pm 1.729$  hours/night. This study found relationship between sleeping hours and depressive symptoms score. Depressive symptoms increased with the decreased of sleeping hours and vice versa. These sleep disorders have also been documented in rat models of depression, such as learned helplessness (Adrien et al. 1991) More than two thirds of the cardiac patients in similar study complained of sleep disturbances.<sup>[4]</sup>

Duration of MI of respondents revealed by documented review range from one and half months to six years and four months. Mean duration of MI was one year and six months. In this study, there was no relation between total duration of MI and social support score. But linear negative correlation found between total duration of MI and depressive symptoms score. Earlier study reported, patients with worsened support had greater risk of angina (relative risk=1.46), lower disease-specific quality of life ( $\beta=-7.44$ ), lower general mental functioning ( $\beta=-4.82$ ), and more depressive symptoms ( $\beta=1.94$ ) (all  $p \leq 0.01$ ).<sup>[8]</sup> Intervening on low support during early recovery may provide a means of improving outcomes In prior work, reported an association between low levels of perceived social support measured at the time of the AMI hospitalization and poorer patient-centered outcomes within the first year.<sup>[8]</sup>

Those took only medicine other than PCI or CABG as revascularization or treatment procedure for economic or other reason had low social support and depressive score  $\geq 10$ . Similar study showed, during a 2-year prospective follow-up of patients after CABG, cardiac events were significantly more common among patients with chronic

depression as compared to patients without depressive symptoms. Hospitalization rate among patients with chronic depression was significantly higher. Here, patients with no history of angiogram during their index hospitalization had low social support and depressive symptoms score  $\geq 10$ . Similar study found same result.<sup>[9]</sup>

This study found statistically significant relation between close friend with social support; with the increased of number of close friend in regular contact, increased score of social support. It appears that good support can constitute a sort of "psychotherapy of everyday life."<sup>[13]</sup> It has been argued that inadequate social support and isolation from others lead to depression, particularly in the face of life crises.<sup>[6]</sup>

In this study, no association was found between depressive symptoms with hypertension and hypercholesterolemia except diabetes mellitus. Significantly higher number of patients with Major Depressive Disorder and sub-syndromal symptoms had hypertension and diabetes mellitus.<sup>[1]</sup> Another study found significant association between low serum cholesterol and depressive symptoms. Present study found significant association between beta-blocker, insulin and hormone altering drug (exogenous estrogen in menopausal women) with depressive symptoms. Looking back on about 40 years of literature on beta-blockers and depression, the discussion started with an impressive amount of case reports strongly suggesting a relationship between the use of a b-blocker and the development of depression in the individual patients described.<sup>[10]</sup> A study showed that insulin treatment was related to the presence of depressive symptoms.<sup>[17]</sup> This study found relationship between depressive symptoms menopausal status and sedative taking habit. Earlier study showed many patients were prescribed anxiolytic/sedatives for sleep problems associated with their depression.<sup>[11]</sup>

In this study, respondents with low social support had major depression experienced MI more than once in their life. Previous prospective study showed AMI patients with low SS have worse health status and more depressive symptoms during the first year of recovery than those with high SS.<sup>[17]</sup> This pattern is consistent across a broad range of outcomes, is particularly strong for women, and does not vary appreciably over time.<sup>[14]</sup>

From the above discussion, it shows that socio-demographic characteristics like age group, sex, family type, occupation, found no influence on social support; and the variable including marital status, economic status had influenced depressive symptoms.<sup>[15]</sup> Proportion of no depression or sub-threshold depressive symptoms was 56.3%, whereas major or moderately severe depression was 43.7% among respondents with old MI and

proportion of low social support was 80.4%, whereas moderate social support was 19.6% and no respondent found with high social support which was unlikely to our country prospect.<sup>[18]</sup> This cross sectional study found relationship between social support and depressive symptoms following myocardial infarction.

## CONCLUSION

A high proportion of major depressive symptoms were found which represents less than half of the study population. Depressive symptoms had significant association with duration of sleep, difficulty in initiating and maintaining sleep, sedatives like bromazepam, clonazepam and also with comorbid condition like diabetes mellitus, with some medicine prescribed after MI like beta-blocker, insulin used by diabetic patient, hormone altering drug used by post-menopausal women and menopausal women themselves. Among the depressed MI patients most of them experienced myocardial infarction more than once and their social support was low. That indicated major depression related to low social support which might be cause of further cardiovascular events. So further work should be offered to find out the relation of social support, depressive symptoms and effect of these in health status.

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