



Study of prevalence of depression and impact of depression in patients following acute myocardial infarction

Abstract

Background: Depression has been found to be associated with cardiovascular diseases in various studies done in different parts of the world. Whether depression really develops after an attack of acute myocardial infarction (AMI) in hospitalised patients was not evaluated in this region of our country prior to the current work. **Aim:** To evaluate the prevalence of depression and impact of depression in AMI patients during the period of hospitalisation. **Materials and Methods:** Patients were recruited for the study after fulfilling the selection criteria and who had documented AMI within four to five days of hospitalisation. Informed consent of the patient and ethical committee clearance was obtained. To collect data semi-structured interview schedule was used. Assamese versions of 21 self-report items Beck Depression Inventory (BDI) and observer-rated 17 items Hamilton Rating Scale for Depression (HAM-D) were administered to 50 AMI patients. Data were analysed with chi-square test, Pearson coefficient of correlation, and student t test wherever applicable. p -value < 0.05 was considered test of significance in this study. **Result:** Fifty cases of AMI were evaluated from August 2007 to July 2008. Thirty six per cent of AMI patients and 34% of AMI patients were found to have depression as per BDI and HAM-D scales respectively. Depression has an impact on duration of hospital stay significantly ($p < 0.019$) but not on gender difference ($p = 0.089$). Correlation of mean scores of both HAM-D and BDI scales was done by Pearson coefficient of correlation and was found to be significant at .01 level. **Conclusion:** Depression was found to be high in AMI patients during the period of hospitalisation in both the depression rating scales and it has an impact on prognosis of the patients.

Keywords: Cardiovascular Diseases. Hospitalisation. Prognosis.

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Introduction

Acute myocardial infarction (AMI) is a common presentation of ischaemic heart disease (IHD). The classical symptoms of AMI include sudden onset of chest pain, shortness of breath, nausea, vomiting, palpitation, and anxiety. It generally occurs when there is thrombotic occlusion of atherosclerotic coronary artery. The World Health Organization (WHO) estimated that in 2002, 12.6% deaths worldwide were from IHD. In India, cardiovascular disease (CVD) is the leading cause of death.[1] One study from rural area of Rajasthan, India had reported that CHD contributes to eight per cent of patients attending a general physician's clinic.[2] In India, typically acute coronary events occur at least ten years earlier than in Caucasian and Latin American countries.[3] AMI was previously defined by clinical findings, electroencephalography (ECG), and laboratory investigations. But current acceptable definition is as per redefined criteria by Joint European Society of Cardiology and American College of Cardiology Committee.[4] All medically ill patients do experience depression during their illness period but it is not always detected or evaluated. In

current scenario, depression is a widely prevalent illness. The World Health Organization (WHO) projects that by the year 2020, depression will remain a leading cause of disability, second only to cardiovascular disease, accounting for 11% of world's total disease burden.[5] It is seen that AMI patients with depression have an approximate two to four fold risk of mortality compared to non-depressed patients.[6,7] Studies looking at patients after AMI have reported prevalence rates of depression ranging from 16 to 23%.[8,9] It has been found that patients suffering from depression are three times as likely to be noncompliant with medical treatment regimes compared to non-depressed patients.[10] Similar findings relating to drug adherence are reported from this part of the globe as well.[11] Depression has been found to be related with reduced quality of life to a degree or greater than that of other chronic health problems.[12-14]

Thus evaluation of depression may be helpful in providing proper diagnosis and treatment in patients with AMI. Several studies on depression in AMI have been done in the West and findings have been heterogenous in terms

of symptomatology, aetiology, and responsiveness to particular treatment. Compared to the West, very few studies have been done in India and the present study will be the first of its kind in this institution. This study thus intends to find whether depression really exists after AMI so that we can take holistic approach to their problems and relieve them of their distress.

Materials and methods

Aim and objective

1. To evaluate the prevalence of depression in patients hospitalised following AMI.
2. To find out the impact of depression on duration of hospital stay in patients with AMI.
3. To see the correlation between the depressive scores on both the depression rating scales.

Place of study

This study has been conducted on patients admitted in the Department of Cardiology of Gauhati Medical College and Hospital (GMCH). GMCH is a tertiary care institute situated in Guwahati and receives patients from Assam as well as entire North-East India.

Period of study

The period of study extended from August 2007 to July 2008.

Study design

This is a cross sectional study.

The study sample comprised of fifty consecutively selected subjects admitted in the Department of Cardiology of GMCH and diagnosed as having AMI and meeting the selection criteria. The diagnosis of AMI was made using the redefined criteria for AMI by the consultant of cardiology department.

Inclusion criteria

1. Both male and female patients.
2. Age 24-65 years, both inclusive.
3. Literate in Assamese.
4. Diagnosis of AMI as per the redefined AMI criteria.[4]

Exclusion criteria

1. Patients with diabetes mellitus and hypothyroidism.
2. Previous bypass surgery or coronary angioplasty.
3. Valvular heart disease and known cardiomyopathy.
4. Patients with history of alcohol or substance abuse.
5. Patient receiving any psychotropic medication.

Tools used for assessment

1. A semi-structured interview schedule to collect the socio-demographic data.
2. Hamilton Rating Scale for Depression (HAM-D).
3. Translated and validated version of Beck Depression Inventory (BDI).

Method of collecting information

Ethical clearance for the study has been obtained from the institutional ethical committee. After selecting subjects as per selection criteria, an informed consent for participation in the study was taken from all patients. The patient diagnosed with AMI as per selection criteria were then subjected to a detailed interview and tools were administered within four to five days after hospitalisation. To assess the duration of hospital stay we collect information regarding date of discharge from indoor register book of the cardiology department. The register book has the record of date of admission and date and time of discharge of the patients. For all cases, privacy of interview and confidentiality were strictly maintained.

HAM-D

HAM-D was introduced and developed by Max Hamilton in 1960 to monitor the severity of major depression, with a focus on somatic symptomatology. It is an observer-rated scale consisting of 17 to 24 items. We used 17 items scale; total score ranging zero to 50.[15]

BDI

BDI was developed in the early 1960s by Aaron Beck to rate severity of depression. BDI includes 21 self-report items; the total score ranges from zero to 63. Score zero to nine are considered minimal, ten to 16 mild, 17 to 29 moderate, and 30 to 63 severe. The cutoff score in this study was nine for a diagnosis of depression.[16] The scale was designed to allow patients report of the types and severity of depressive symptoms for the week prior to the date of assessment. BDI scale has been translated to Assamese language and validated by two consultants of the Department of Psychiatry, GMCH; back translation into English by another expert. The scale has been used in medically ill hospitalised patients as a screening tool. Both BDI and HAM-D have been proved to have acceptable abilities for screening of post-MI depression.[17]

Analysis of data

The data thus obtained has been analysed by both descriptive and inferential statistical procedures wherever applicable. $p < 0.05$ has been considered test of significant in this study. Chi-square test has been used for categorical data. Correlation between mean scores of BDI and HAM-D was evaluated with Pearson's coefficient of correlation. Student t test has been used to compare between the numerical data of two groups.

Results

From Table 1 it is evident that percentage of males in AMI patients was 84% and that of females was 16%. Again the mean age in males is 50.1 years; on the other hand, the mean age of female is 56.4 years.

Table 2 shows number and percentage of patients having depression according to BDI. Amongst the male and female patients total 36% was depressed and the mean score on BDI was 15.11. Table 2 also represents the sex distribution of depressed and non-depressed AMI patients. When sex difference was compared between depressed and

Table 1: Distribution of study population based on socio-demographic data

	Male (n=42 [84%], mean age=50.1 years)		Female (n=8 [16%], mean age=56.4 years)		Total (n=50)	
	n	%	n	%	n	%
Age						
24-30	1	2.4	-	-	1	2.0
31-40	9	21.4	-	-	9	18.0
41-50	11	26.2	1	12.5	12	24.0
51-65	21	50.0	7	87.5	28	56.0
Religion						
Hindu	31	73.8	6	75.0	37	74.0
Muslim	11	26.2	1	12.5	12	24.0
Christian	-	-	1	12.5	1	2.0
Education						
Primary school pass	13	31.0	4	50.0	17	34.0
Class X pass	8	19.0	2	25.0	10	20.0
Graduate	13	31.0	2	25.0	15	30.0
Postgraduate	1	2.4	-	-	1	2.0
Marital status						
Married	42	100	7	87.5	49	98.0
Widow/widower	-	-	1	12.5	1	2.0
Locality						
Rural	22	52.4	5	62.5	27	54.0
Urban	20	47.6	3	37.5	23	46.0
Socioeconomic status						
Lower	5	12.0	-	-	5	10.0
Lower middle	19	45.2	5	62.5	24	48.0
Middle	12	28.6	1	12.5	13	26.0
Upper middle	3	7.1	1	12.5	4	8.0
High	3	7.1	1	12.5	4	8.0
Occupation						
Unemployed	4	9.5	5	62.5	9	18.0
Employed	20	47.6	2	25	22	44.0
Self-employed	18	42.9	1	12.5	19	38.0
Type of family						
Nuclear	36	85.7	7	87.5	43	86.0
Joint	6	14.3	1	12.5	7	14.0

non-depressed AMI patients no statistically significant difference was found (chi-square 2.902, $p=0.089$). The table shows number and percentage of patients and severity of depression. Thirty six per cent of the patients had depression clinically. Twenty six per cent of patients were having mild depression and ten per cent having moderate depression according to BDI. No severely depressed patient was found among them. The table also shows number and percentage of patients having depression according to HAM-D scale. Amongst the male and female patients 34% were found to be depressed and the mean score on HAM-D scale was 12.90. The table shows that 36% of patients had clinically significant depression according to BDI and 34% of patients had clinically significant depression according to HAM-D scale.

The coefficient of correlation between BDI and HAM-D is 0.890. The correlation is significant at the 0.01 level, hence the relationship is significant. The table also shows that the mean duration of hospital stay among the non-depressed patients was 8.375 days and the mean duration of hospital stay among depressed patient was 9.333 days. The difference of mean duration of hospital stay among the depressed and non-depressed is 2.43, which is a significant value, indicating higher duration of hospital stay by the depressed patients.

Discussion

Our study found that prevalence of depression is 36% in the patients with AMI within five days of hospitalisation. The

Table 2: Distribution of study population based on clinical data

Score on BDI of depressed AMI patients						
Sex	n	Total %	Mean score	SD		
Male	13	36	15.11	3.104		
Female	5					
Sex distribution of depressed and non-depressed AMI patients						
Sex	Depressed (%)		Non-depressed (%)		Chi-square	p-value
Male	13 (30.9)		29 (69.05)		2.902	0.089
Female	5 (62.5)		3 (37.5)			
Distribution of severity of depression according to BDI						
Total depression		Mild		Moderate		
n	%	n	%	n	%	
18	36	13	26	5	10	
HAM-D score of depressed AMI patients						
Sex	n	Total %	Mean score	SD		
Male	12	34	12.90	3.432		
Female	5					
Correlation between BDI and HAM-D						
Scale	n	%	Mean score	Correlation coefficient		
BDI	18	36	15.11	0.890*		
HAM-D	17	34	12.90			
Comparison of mean duration of hospital stay (in days) between depressed and non-depressed patients according to BDI						
Patients	n	Mean	SD	t	p	
Non-depressed	32	8.375	1.338	2.43	0.019	
Depressed	18	9.333	1.328			

BDI: Beck Depression Inventory, AMI: Acute myocardial infarction, SD: Standard deviation, HAM-D: Hamilton Rating Scale for Depression, *Significant at the 0.01 level

mean score on BDI in AMI patients was 15.11. Our finding is almost similar with other Western studies. Lauzon *et al.*[18] found score on BDI more than ten in 35% cases of AMI within two to three days of hospitalisation. Lesperance *et al.*[19] reported 32% of post AMI patients had score on BDI more than ten within two to five days of hospitalisation. Similarly, Lane *et al.*[20] reported 30% of post AMI patients had score on BDI more than ten within 15 days of hospitalisation.

Our finding of 36% cases of depression in patients with AMI is slightly higher than that found by other studies. Bush *et al.*[6] reported 20% of AMI cases scored above ten on BDI during the period of hospitalisation. Davis and Jansen[21] found that only ten per cent of AMI cases had BDI score above 13 during hospitalisation. Luutonen *et al.*[22] found depression in 21% of the cases. On the other hand, prevalence of depression found in this study is lower than that reported by Steeds *et al.*[23] The prevalence of depression in their study was 47%.

Prevalence of depression in AMI during the period of hospitalisation has been reported by many studies. Schleifer *et al.*[24] found that 45% of post AMI patients met diagnostic criteria for major or minor depression during eight to ten days after hospitalisation. Carney *et al.*[25] reported prevalence of depression in 23% of AMI patients five to seven days after hospitalisation. Bennett and Mayfield[26] reported

prevalence of depression to be 13% within one week of AMI. Several studies have found prevalence of depression during the period of hospitalisation following AMI.[27-30]

When severity of depression was assessed across the AMI patients, mild depression was found at the rate of 26%, followed by moderate depression in ten per cent. In our study, none of the AMI patients were found to have severe depression. Mild to moderate symptoms of depression have been reported by Western studies on BDI.[6,18-20]

We have also administered HAM-D and prevalence of depression is found to be 34% in AMI. Mean score on 17 items HAM-D scale is 12.90. The prevalence of depression is similar with the findings of Mahapatra *et al.*[31] but the mean score in their study is 15.0±5.33, which is higher than our findings. On the other hand prevalence of depression was found to be lower in Western studies according to 17 items HAM-D scale. Barefoot *et al.*[32] found that prevalence of depression was 28% in AMI patients. But Taylor *et al.*[33] reported prevalence of depression in only 13% cases.

Correlation between BDI and HAM-D mean scores have been evaluated and a significant correlation was found at .01 level. High correlation of BDI and HAM-D scores was reported by Back *et al.*[34] In their study mean correlation of BDI with clinical ratings and HAM-D were 0.72 and 0.73 respectively in psychiatric subjects. With non-psychiatric

subjects the mean correlations of BDI and HAM-D were 0.60 and 0.74 respectively.

We also evaluated the impact of depression on gender difference and duration of hospital stay. We did not find impact of depression on gender difference in AMI patients. It was not statistically significant ($p=0.089$) in contrast to the study done by Parashar *et al.*[35] where depressive symptoms were more prevalent in women compared with men (29% versus 18.8%, $p<0.001$). It may be due to less female data in our study as literate in Assamese was an inclusion criteria. In our sample 84% AMI cases were male and 16% were females although male preponderance in AMI cases has been reported by Mahapatra *et al.*[31]

On evaluation of duration of hospital stay in AMI cases we found that the mean duration of hospital stay in depressed AMI patients was 9.333 and in case of non-depressed group it was 8.375. On statistical analysis this difference was found significant ($p=0.019$) indicating higher duration of hospital stay by the depressed AMI patients than the non-depressed group. In our study, mean duration of hospital stay in non-depressed AMI patients was similar with the report of Varnava *et al.*[36] In their study median duration of hospital stay was six to eight days. But the result of Skoulas *et al.*[37] and McNeer *et al.*[38] were higher than our findings of non-depressed AMI patients. McNeer *et al.*[38] had reported mean duration of hospital stay of AMI patients to be 11 ± 2 days and Skoulas *et al.*[37] reported 9.7 days, on the other hand Lauzon *et al.*[18] reported median length of hospital stay was 12 days in case of BDI score above ten, and in case of BDI score less than ten had duration of hospital stay of 11 days. This is higher than our findings. Mayou *et al.*[39] reported mean duration of hospital stay in emotionally distressed and non-distressed AMI patients to be 10.14 and 8.31 respectively, which is slightly higher than our findings. But duration of hospital stay in non-depressed group is similar with our findings.

Limitations

Our study has certain limitations. Firstly, the sample taken was small. A larger sample would have been more representative. Secondly, we have not assessed the severity of AMI and whether the higher depressive scores are related to severity of AMI has not been evaluated. Thirdly, being a cross sectional study the patients were assessed only once within four to five days following AMI, therefore follow up study will determine the impact of depressive symptoms on future prognosis of AMI. A recent published work from this part followed up such patients.[40]

Conclusions

Despite the limitations, on the basis of the findings in our study we can make the following conclusions:

1. AMI patients have significantly higher scores on both the depression rating scales.
2. Prevalence of depression was found to be high during the period of hospitalisation.
3. Depression has a significant negative impact on prognosis of AMI patients during hospitalisation.

From the findings of this study we can thus recommend that the clinical and nursing staff of cardiology department should be aware of depressive symptoms appearing after AMI or admitted with AMI, as there have been observations that untreated depressive patients have high mortality rate than treated post-AMI depressive patients. Routine psychological assessment of AMI patients in hospital should be a part of the management of these groups of patients. Many of these patients suffered from mild to moderate depression and can be treated by psychotherapeutic intervention necessitating antidepressant medication in a small group. Management of depression in these groups of patients improves treatment compliance, life style modification, and thereby leading to a better quality of life.

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