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RESEARCH ARTICLE

The Relationship Between Incidence of Depression After Myocardial Infarction (MI)

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Abstract:

Objective:

Depression is predicted to be the leading cause of mortality and morbidities in the next few years. Its association with cardiovascular diseases is well-established from various researches. The aim of this study is to evaluate the incidence of depression of co-morbid psychiatric disorders among patients with a recent history of myocardial infarction (MI).

Methods:

In this retrospective study, patients with a history of myocardial infarction marked by electrocardiographic (ECG) and enzymatic findings referred to our psychiatric center were included. The MMPI questionnaire was used to evaluate the prevalence of depression along with other psychiatric disorders. SPSS v18 was used to evaluate the data recorded and analyzed from these questionnaires.

Results:

Of 50 patients studied, the prevalence of depression is the greatest (63%) in patients with anterior septal MI. Furthermore, 26% of women and 24% of men with depression and hysteria were the common comorbidity reported. To it, 15 patients aged 60-69 years had post-MI depression.

Conclusion:

Our study reports an increased incidence of post-MI depression in the general targeted population. Further investigation and therapeutic measures can decrease future repercussions and the incidence of other cardiovascular events, including recurrent MI.

Keywords: Myocardial infarction (MI), MMPI questionnaire, Depression, Cardiovascular events, Psychiatric disorders, Electrocardiographic (ECG).

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1. INTRODUCTION

Cardiovascular diseases are known as the leading cause of mortality and disability, globally [1]. Acute myocardial infarction is characterized by reduced blood supply, oxygen, and nutrition to cardiomyocytes, which eventually leads to cell injury and death [2]. Nausea/vomiting, chest pain, shortness of breath, and cold sweats are some commonly known indications of MI [3, 4]. Stress and depression are common in patients with a history of myocardial infarction (MI) [5]. Psychiatric disorders are also commonly reported in these patients [6]. Depression is also characterized by increased mortality and morbidity following MI [7]. Studies have indicated that patients with coronary heart disease are at a greater risk of mortality due to depression and low perceived social support [8, 9]. Furthermore, 20% of these patients would like to have major depression, whereas 27% are known to have minor depression [10]. Antidepressants effectively treat depression in patients with MI [1]. 20-40% of the MI patients experience anxiety and depression, 18 months after the onset of MI [11]. Studies have shown that psychological stress leads to dysregulation of hemostasis, such as causing hypercoagulation, alteration of fibrinolysis, and platelet functioning [12]. Post-MI anxiety is also associated with 9.37 folds increased risk of recurrent MI [13]. The aim of this study is to evaluate the

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incidence of depression of co-morbid psychiatric disorders among patients with a recent history of myocardial infarction (MI).

2. PATIENTS AND METHODS

In this retrospective study, 100 patients who were reported to our psychiatric center after myocardial infarction in 2020, were included. Each patient had a proven history of myocardial infarction diagnosed by electrocardiography (MMPI) and enzyme evaluation. The Minnesota Multiphasic Personality Inventory (MMPI) Questionnaire was used to assess MI patients after 16-18 months of MI. Written consent was obtained from the patients prior to participation in the study. Exclusion criteria of the study included patients with severe chronic diseases like malignancy, family history of depression or other psychiatric disorders, those taking SSRIs [selective serotonin reuptake inhibitors], history of postpartum depression, and those who did not consent to participate in the study.

MMPI is a widely used psychiatric test in which each patient responds to 550 multiple choice questions under the supervision of the psychiatrist. Scores are calculated based on 'cannot say', inconsistencies (F), lies (L), and symptoms (K). Hypochondria, Hysterical Depression, Psychopanical Attitudes, Paranoid, Schizophrenia, Hypomania, Masculinity-Feminity, Obsessive-Compulsive Disorder and depression are also measured in the questionnaire. With the help of clinicians, patients were asked to fill MMPI questionnaire, along which demographic information of the patients was obtained.

The data obtained from these questionnaires were analyzed by the clinical psychiatrist in collaboration with the cardiologist and was statistically analyzed using SPSS v18.

This study was approved by the Research Ethics Board of Lorestan University of Medical Sciences. The unique identification number is: research registry 7430. The methods have been reported according to the CARE guidelines [14]. The procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation of the institute and with the Helsinki Declaration of 1975, as revised in 1983.

3. RESULTS

Of the 100 patients with myocardial infarction (MI) according to the type of MI, 22 (22%) men and 22 (22%) women had inferior ST-segment elevation MI (STEMI), where 14 of these had depression, 4 (4%) men and 6 (6%) women had non-Q MI, and extensive anterior MI and 6 of them had depression, while 24 (24%) men and 22 (22%) women had anterior septal MI and 30 had depression Table **1**.

Of 50 patients evaluated for the study, 24 (24%) males and 13 (26%) females were without depressive symptoms, whereas, 26 (26%) females and 24 (24%) males had depressive symptoms. Furthermore, among these, 54 (54%) patients presented with depression had other psychiatric comorbidities: anxiety (n=4), aggression (n=10), hysteria (n=24), hypochondria (n=6), and schizophrenia (n=12). 54 (54%) of the total patients had psychiatric depression Table **2**. Of 50 females in the study, 26 were depressed, and 4 had sixth-degree. Of the 50 male patients, 8 were literate, 4 of whom were depressed. Of the 34 literate people, 14 were depressed. And one out of two people with a high school diploma was depressed, and one out of two with a high school diploma or higher were both depressed. Among 50 deceased patients, out of 20 farmers, 4 died and 16 patients with other jobs (employees, teachers, *etc*.) died, 4 of which had depression. Based on the age-group distribution, 26 of the total patients aged < 50 years, 6 had depression, where 20 patients were aged between 50-59 years in which, 10 had depression, and 24 of those <70 years had depression.

Table 1. Frequency distribution 50 patients based on type of hospitalized MI.

Type of MI	Absolute Frequency			Relative Frequency		
	Male	Female	Total	Male	Female	Total
Inferior	22	22	44	22%	22%	44%
Extensive & NonQ MI	4	6	10	4%	6%	1%
Anterior Septal MI	24	22	46	24%	22%	46%
Total	50	50	100	50%	50%	100%

Table 2. Frequency distribution patients based on type of hospitalized mental illness.

Complications	Relative Frequency			Absolute Frequency		
	Male	Female	Total	Male	Female	Total
Anxiety	0	4	4	0	4%	4%
Aggression	4	6	10	4%	6%	10%
Hysteria	10	14	24	1%	14%	24%
Hypochondria	2	4	6	2%	4%	6%
Schizophrenia	10	2	12	1%	2%	12%
Total	26	30	54	26%	30%	56%

4. DISCUSSION

In a recent meta-analysis, Feng, Li *et al*. [15] reported that the prevalence of post-MI depression was 28.7% from 19 studies based in 10 countries. The researchers also found that the Asian region, female sex, anterior MI, diabetes, and hypertension were significant risk factors for post-MI depression. Our findings from the MMPI test suggest that 63% of patients with post-MI depression have anterior MI.

In a study, Kjellstrom and Gustafsson [1] showed that 39% of MI patients had depression. In addition, they also found that patients who received cognitive behavioral therapy along with a selective serotonin reuptake inhibitor (when required) were associated with an improvement in mental health in these patients. However, it did not affect the survival rate [16]. Serpytis, Navickas [17] randomly selected 50 patients with a history of myocardial infarction, admitted to our psychiatric clinic. Given that the percentage of depression in the community is about 15%, based on the above analysis, we found that 50% of our population had post-MI depression [18]. However, data on the mental state of these patients before MI are not known. Smolderen, Buchanan [19], in their study, reported that 18.7% of MI patients had depression, and the rate of mortality was higher in the untreated group of these patients.

Doyle, McGee [20] and Serpytis, Navickas [17] indicated in their studies that women are at a greater risk of developing post-MI depression. However, our findings did not report any significant differences in the incidence of post-MI depression. Studies have shown that depression is associated with the increased risk of adverse cardiovascular events such as coronary heart disease [21]. Post-MI depression not only adds to increased incidence of other cardiovascular diseases but also mortality following the bypass, percutaneous angiography or other associated treatments [22, 23]. Anxiety and other psychological disorders reduce the overall survival rate following the diagnosis of cardiovascular diseases. Intake of anti-depressants, serotonin inhibitors and cognitive therapies are known to decrease the risk of death and recurrent myocardial infarction in these patients [24].

In our study, patients' evaluation was conducted by means of the MMPI test, nonetheless, Patient Health Questionnaire (PHQ-9) and the 7-item Generalized Anxiety Disorder Scale (GAD-7) are more clinically applicable tests with greater reliability. Furthermore, our study did not evaluate the therapeutic outcomes in these patients and did not include the control group. Overcoming these limitations can help clinicians find a better conclusion about these psychiatric disorders after cardiovascular events and can be controlled in their early stages.

CONCLUSION

Given that the prevalence of depression in people after MI is approximately three times than general population, therapeutic measures and detailed investigation are required in this field of study. Following MI, psychological rehabilitation should be provided to the patients.

AUTHORS' CONTRIBUTIONS

Dr. Alireza Gheini conceptualized and designed the study, drafted the initial manuscript, and reviewed and revised the manuscript.

Dr. Ali Pooria designed the data collection instruments, collected data, carried out the initial analyses, and reviewed and revised the manuscript.

Dr. Afsoun Pourya and Dr. Ermia Farokhi coordinated and supervised data collection and critically reviewed the manuscript for important intellectual content.

LIST OF ABBREVIATIONS

ECG	=	Electrocardiograph
MIl	=	Myocardial Infarction
MMPI	=	Minnesota Multiphasic Personality Inventory
SSRIS	=	Selective Serotonin Receptors Inhibitors

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

All procedures performed in this study involving human participants were in accordance with the ethical standards of the Lorestan University of Medical Sciences committee.

HUMAN AND ANIMAL RIGHTS

No animals/humans were used for studies that are the basis of this study. All human research procedures followed were in accordance with the Helsinki Declaration and its later amendments or comparable ethical standards.

CONSENT FOR PUBLICATION

Informed consent has been obtained from the participants involved from those under 16 years old was given by a parent or legal guardian.

STANDARDS OF REPORTING

CARE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

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None.

CONFLICT OF INTEREST

The authors declare that they have no competing interests

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Declared none.

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