Determination of the Relationship between Major Depression, Anxiety and Sleep with Substance Abuse in Coronary Artery Patients Needing Angiography

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ABSTRACT

Background: Coronary artery disease is among leading causes of mortality and may be accompanied with psychiatric disorders. This is especially true in patients who abuse substances.

Objectives: The aim of this study was evaluation of the major depression, anxiety and sleep in patients needing coronary angiography and their correlation with substance abuse.

Material and Methods: In this descriptive and analytical study, 200 patients needing angiography participated. Data gathered by General Health Questionnaire-28 and clinical interviewing for evaluation of substance abuse. Patients with a score higher than 22 were interviewed by a psychiatrist. Patients whom after psychiatric visit and clinical interview met the criteria were the case group and those who did not meet criteria for psychiatric illness were placed in the control group. Then all of them were evaluated for the substance abuse and finally correlations of the variables were investigated.

Results: 44.5% of 200 individuals participating in this study, had anxiety disorders and sleep problems. Meanwhile, 40% of patients had major depression. No one had problem in social functioning. There was a significant relationship between substance abuse and psychological problems in patients needing angiography. Substance abuse increased risk of psychological problems and patients with substance abuse had higher risk of psychiatric disorders for 7 times.

Conclusions: Heart disease particularly coronary artery one may have negative effect on mental health of patients. As a result, there is need for psychiatric evaluation in these patients and intervention to teach stress control and management. It is recommended that, patients get psychiatric consultation on substance abuse and psychological problems dimension, before anxiety provoking procedures like angiography.

KEYWORDS: mental health, coronary artery disease, angiography, substance-related disorders

INTRODUCTION

Cardiovascular diseases, mainly coronary disease lead to 16 million deaths yearly which includes 30% of morbidity and mortality per year (1). Many of these deaths occur during first hours of symptoms and before any treatment action is taken. As a result, prevention with decreasing risk factors such as by healthy living and psychiatric health, control of blood pressure and weight are very important (2).

Currently, researchers have shown increased attention toward close relation between psychiatric health and cardiac disorders. From a psychiatric perspective, factors contributing to heart disease can be divided into three groups acute (such as sudden stressors), episodic (such as depression) and chronic conditions such as personality characteristics and economic status. Combination of psychiatric care side by side with medical treatment of cardiac patients not only improves living conditions and decreases stress, but can improve overall treatment of these patients. In other words, psychiatric well being can improve treatment of medical condition in these patients (3). On the one hand correlation between substance abuse and psychiatric disorder particularly depression is well known. Patients with cycles of depression have increased interest in substance abuse and have more difficulty in quitting their habit. Substance abuse particularly tobacco products and cigarettes is risk
factor for coronary artery disease and there is need for close cooperation between psychiatrists and cardiovascular specialists in helping these patients (2).

It has been shown that depression contributes to coronary events and worsened performance among coronary patients. In a study, 198 cardiac patients underwent psychiatric interview after angiography and were divided into three groups major depression, minor depression and no depression. Results of this study showed that degree of depression at time of angiography was correlated with costs of healthcare and treatment of coronary artery disease in the next years and patients who were not depressed had less health care costs in the next five years for their cardiac condition (4).

In one study, 299 patients needing angiography were evaluated for their history of opium use. Patients were divided into three groups of nonusers, temporary users and current users. Correlation between abuse of opium and degree of coronary artery disease was evaluated using logistic multi-regression analysis. Patients were divided into three groups with no coronary disease, moderate coronary disease and severe coronary disease. Results showed that current abusers of opium suffer from more severe coronary artery disease compared to nonusers. Although this correlation was also influenced by factors such as cigarette use, age and gender (5).

In a study at Kerman University of Medical Sciences comparison was performed between patients with coronary artery disease and healthy control. It was shown that opium use is an independent risk factor for coronary artery disease (6).

Depression is common among patients with heart disease; yet in a study with 223 participants with heart disease, it was suggested that other factors independent of severity of heart disease such as anemia have been influential (7).

In various studies, physical signs of depression have been a predictor of cardiovascular symptoms among chronic cardiac patients. Additionally, among cardiac patients physical signs of depression are more pronounced than psychiatric signs (8).

In the past 50 years, correlation between cardiac disease and psychosocial risk factors have acquired major attention and the effect of negative excitement, personality characteristics and chronic stress in leading to acute cardiac symptoms has been supported (9).

In another study with participation of 63061 cardiac patients it was shown that patients living in villages have increased rate of depression and they have increased length of hospitalization and morbidity and mortality (10). Use of alcohol also increases risk of heart disease and particularly among women, it may lead to mortality (11). In a study over five years with participation of middle aged men and women, it was shown that marital status, social support and job characteristics can decrease risk of heart disease by 12% in men and by 10% in women (12). Signs of depression among the elderly is considered an independent risk factor for exacerbation of cardiac disease and morbidity and mortality caused by it (13). Anxiety and mood disorders are more prevalent among cardiac patients compared to the normal population (14).

In a study, there was a high degree of congruence in support of the themes of social interaction and social support; feeling safe; improved symptoms; a sense of meaning, purpose and achievement and identity in patients (15).

In a study it has been showed that substance abusers were unaware of the full spectrum of tobacco health risks and most of patients could report only one or two tobacco-related diseases (16).

Based on the above, patients who need coronary angiography to decide severity of their condition and for treatment, are the participants in this study. This study was performed with the goal to determination of anxiety disorders, sleeping and major depression in patients needing coronary angiography and their correlation with substance abuse.

**MATERIALS AND METHODS**

This is a case-control study. The study population included all patients who presented to the Heart Specialty Hospital in Iran who needed angiography in the year 2012. All patients were included until adequate sample size was reached. The sample size needed for the study was estimated at 200 individuals. All participants, attended at the project until the end of the project. All participants gave informed consent before participation and the whole project was confirmed in the ethical committee of the hospital.

The study was performed in two parts. First, all patients with coronary artery disease who had been hospitalized in the hospital for angiography completed questionnaires related to demographic information, history of substance abuse and number of angiographies performed. Then, the participants completed the
GHQ1-28 questionnaire. This questionnaire has 4 subdivisions including physical symptoms, sleep disturbance and anxiety, social dysfunction and severe depression. Scoring is via the likert method (0-1-2-3). The cut off point in this study was chosen at 22, because this cut off point has been determined in the original format of GHQ-28. In the second part, patients whose score on the GHQ-28 was above 22- which indicates low mental health- were evaluated clinically via interview by a psychiatrist.

Patients whom after psychiatric visit and clinical interview met the DSM-IV-TR2 criteria were the case group and those who did not meet criteria for psychiatric illness were placed in the control group. Both groups were matched on dimensions of severity of coronary heart disease and other demographic variables. Next, both group were evaluated regarding substance abuse. Information gathered was analyzed using the SPSS-16 software. Analysis of the information and evaluation of correlation between various variables and psychological status were performed using the one-sided variance test, student-t test or the Spearman Rho correlation and to predict psychiatric health or illness logistic regression analysis was used.

RESULTS

Results showed that from 200 patients participating in this study 44.5% had psychological problems. Participants scored higher than 8 on the anxiety and sleep portion of the questionnaire and were considered to have disturbance (Table 1).

In terms of marital status, divorced people had lowest rate of mental health and the highest rate of sleeping and anxiety disorders were seen in widow ones. Sleeping and anxiety disorders were also seen in married people. Substance abusers had lower mental health than non abusers and the most aspect of low mental health in substance abusers was seen in anxiety and sleeping disorders (P=0/05).

Logistic regression analysis showed that probability of having psychiatric disorder was 7 times higher in those with substance abuse compared to those without it. The chance of having psychiatric disturbance among widowed or divorced individuals was 20 times that of married individuals. The sensitivity and specificity for diagnosis was 73.6 and 75.2%.

Results showed that there was no statistically significant correlation between mean psychiatry scores and age, gender, education level, job, living location and number of angiographies (Table 2,3,4,5).

Significant correlation was found between marital status and substance abuse with psychiatric well being (Table 6, 7).

The most decreasing aspect of mental health was seen in physical health status. The overall status of mental health of women was worse than men and anxiety and sleeping disorders had highest score in both men and women. In terms of education, the worst health status was seen in those with high school education. Those with high school education had the highest rate of anxiety and sleeping disorders. Among the various occupations, military personnel had the lowest rate of mental health and highest rate of anxiety and sleeping disorders. Patients, who had undergone coronary angiography for two times, had more severe decline in mental health than those who had undergone just one coronary angiography.

Tables:

<table>
<thead>
<tr>
<th>Questionnaire divisions</th>
<th>Mean score</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical health</td>
<td>8.1</td>
<td>3.8</td>
</tr>
<tr>
<td>Anxiety and sleep</td>
<td>8.7</td>
<td>3.3</td>
</tr>
<tr>
<td>Social functioning</td>
<td>7.1</td>
<td>3.3</td>
</tr>
<tr>
<td>Depression</td>
<td>6.0</td>
<td>3.6</td>
</tr>
<tr>
<td>Total psychiatric well-being</td>
<td>29.9</td>
<td>11.8</td>
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</table>

Table 2- Mean and standard deviation of GHQ-28 scores based on gender

<table>
<thead>
<tr>
<th>GHQ-28 score</th>
<th>Physical signs</th>
<th>Anxiety and sleep disturbance</th>
<th>Social functioning</th>
<th>Depression</th>
<th>Total score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Mean (Std dev)</td>
<td>Mean (Std dev)</td>
<td>Mean (Std dev)</td>
<td>Mean (Std dev)</td>
<td>Mean (Std dev)</td>
</tr>
<tr>
<td>Male</td>
<td>7.7 (3.8)</td>
<td>8.6 (3.4)</td>
<td>7.1 (3.3)</td>
<td>5.7 (3.5)</td>
<td>29.1 (12.2)</td>
</tr>
<tr>
<td>Female</td>
<td>8.6 (3.7)</td>
<td>9.0 (3.1)</td>
<td>6.9 (3.3)</td>
<td>6.2 (3.6)</td>
<td>30.8 (11.2)</td>
</tr>
</tbody>
</table>

1 General Health Questionnaire
2 Diagnostic and Statistical Manual of Mental Disorders- Forth Edition-Text Revised
Table 3- Mean GHQ-28 scores and standard deviation based on education

<table>
<thead>
<tr>
<th>Education</th>
<th>Physical signs Mean (Std dev)</th>
<th>Anxiety and sleep Disturbance Mean (Std dev)</th>
<th>Social functioning Mean (Std dev)</th>
<th>Depression Mean (Std dev)</th>
<th>Total score Mean (Std dev)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>8.5 (3.8)</td>
<td>8.8 (3.2)</td>
<td>7.0 (3.2)</td>
<td>6.0 (3.5)</td>
<td>30.3 (11.5)</td>
</tr>
<tr>
<td>Prim and Sec</td>
<td>7.4 (3.4)</td>
<td>7.8 (3.1)</td>
<td>6.5 (3.8)</td>
<td>5.5 (4.0)</td>
<td>27.2 (12.0)</td>
</tr>
<tr>
<td>High school</td>
<td>7.7 (4.3)</td>
<td>9.9 (4.5)</td>
<td>7.8 (3.4)</td>
<td>6.3 (4.2)</td>
<td>31.7 (14.0)</td>
</tr>
<tr>
<td>University</td>
<td>7.5 (3.9)</td>
<td>8.8 (3.5)</td>
<td>7.6 (2.9)</td>
<td>6.0 (3.4)</td>
<td>29.9 (11.9)</td>
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<tr>
<td>No of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>7.7 (3.6)</td>
<td>8.5 (3.0)</td>
<td>5.3 (1.8)</td>
<td>3.9 (3.4)</td>
<td>23.0 (10.0)</td>
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<tr>
<td>Prim and Sec</td>
<td>7.4 (3.4)</td>
<td>7.8 (2.8)</td>
<td>6.3 (3.0)</td>
<td>4.6 (4.2)</td>
<td>26.5 (11.0)</td>
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<tr>
<td>High school</td>
<td>7.1 (3.0)</td>
<td>7.8 (2.5)</td>
<td>5.8 (2.0)</td>
<td>4.1 (3.2)</td>
<td>25.1 (10.0)</td>
</tr>
<tr>
<td>University</td>
<td>6.9 (3.0)</td>
<td>7.7 (2.2)</td>
<td>5.7 (2.1)</td>
<td>4.0 (3.2)</td>
<td>23.3 (10.0)</td>
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</table>

Table 4- Mean GHQ-28 scores and standard deviation based on job

<table>
<thead>
<tr>
<th>Education</th>
<th>Physical signs Mean (Std dev)</th>
<th>Anxiety and sleep Disturbance Mean (Std dev)</th>
<th>Social functioning Mean (Std dev)</th>
<th>Depression Mean (Std dev)</th>
<th>Total score Mean (Std dev)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housewife</td>
<td>8.4 (3.9)</td>
<td>8.9 (3.3)</td>
<td>6.8 (3.4)</td>
<td>6.2 (3.6)</td>
<td>30.4 (11.5)</td>
</tr>
<tr>
<td>Labor</td>
<td>8.6 (3.9)</td>
<td>8.3 (3.2)</td>
<td>7.7 (3.0)</td>
<td>6.2 (3.5)</td>
<td>31.7 (12.3)</td>
</tr>
<tr>
<td>Office</td>
<td>8.9 (4.1)</td>
<td>9.6 (3.6)</td>
<td>7.7 (3.1)</td>
<td>6.0 (3.0)</td>
<td>31.2 (12.4)</td>
</tr>
<tr>
<td>Teacher</td>
<td>7.6 (3.5)</td>
<td>7.8 (3.6)</td>
<td>7.8 (3.0)</td>
<td>5.8 (4.2)</td>
<td>29.0 (13.0)</td>
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<tr>
<td>Shop-owner</td>
<td>5.8 (2.6)</td>
<td>7.6 (2.6)</td>
<td>7.3 (1.8)</td>
<td>3.9 (3.4)</td>
<td>22.3 (7.6)</td>
</tr>
<tr>
<td>Farmer</td>
<td>8.2 (3.9)</td>
<td>8.5 (3.2)</td>
<td>7.2 (3.5)</td>
<td>6.4 (3.5)</td>
<td>30.3 (12.0)</td>
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<tr>
<td>Retired</td>
<td>7.1 (2.8)</td>
<td>8.9 (2.1)</td>
<td>7.8 (2.8)</td>
<td>4.6 (3.2)</td>
<td>28.4 (7.1)</td>
</tr>
<tr>
<td>Driver</td>
<td>7.7 (3.6)</td>
<td>7.9 (5.5)</td>
<td>6.7 (4.0)</td>
<td>4.9 (4.0)</td>
<td>27.2 (16.0)</td>
</tr>
<tr>
<td>Official</td>
<td>9.5 (5.0)</td>
<td>12.5 (7.8)</td>
<td>7.5 (9.2)</td>
<td>7.5 (6.4)</td>
<td>37.0 (28.3)</td>
</tr>
</tbody>
</table>

Table 6- GHQ-28 scores and standard deviation based on marital status

<table>
<thead>
<tr>
<th>Marital status</th>
<th>Physical signs Mean (Std dev)</th>
<th>Anxiety and sleep Disturbance Mean (Std dev)</th>
<th>Social functioning Mean (Std dev)</th>
<th>Depression Mean (Std dev)</th>
<th>Total score Mean (Std dev)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>7.9 (3.7)</td>
<td>8.4 (3.2)</td>
<td>6.8 (3.3)</td>
<td>5.6 (3.4)</td>
<td>28.7 (11.3)</td>
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<tr>
<td>Divorced</td>
<td>11.4 (1.0)</td>
<td>2.6 (3.0)</td>
<td>10.4 (1.7)</td>
<td>10.3 (2.0)</td>
<td>44.7 (5.6)</td>
</tr>
<tr>
<td>Widowed</td>
<td>11.4 (3.5)</td>
<td>11.8 (2.7)</td>
<td>10.0 (2.0)</td>
<td>9.3 (3.8)</td>
<td>42.7 (10.2)</td>
</tr>
</tbody>
</table>

Table 7- Mean GHQ-28 scores and standard deviation based on substance abuse status

<table>
<thead>
<tr>
<th>Substance abuse</th>
<th>Physical signs Mean (Std dev)</th>
<th>Anxiety and sleep Disturbance Mean (Std dev)</th>
<th>Social functioning Mean (Std dev)</th>
<th>Depression Mean (Std dev)</th>
<th>Total score Mean (Std dev)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>9.3 (3.9)</td>
<td>9.8 (3.7)</td>
<td>8.5 (3.0)</td>
<td>7.4 (3.7)</td>
<td>35 (12.7)</td>
</tr>
<tr>
<td>No</td>
<td>7.2 (3.3)</td>
<td>7.9 (2.7)</td>
<td>5.9 (3.0)</td>
<td>4.8 (3.1)</td>
<td>25.7 (9.1)</td>
</tr>
</tbody>
</table>

DISCUSSION

According to above results, based on presence of psychiatric disorders and substance abuse problem in many patients, it can be recommended that teaching meditation skills to cope with stressors such as angiography or heart disease itself and giving patients hope when faced with anxiety about heart attack should be considered by psychiatrists. In this study 40.5% had major depression and 44.5% had anxiety and sleep disorders.

Findings suggest that there is daily need for psychiatric evaluation of patients with coronary artery disease. This study showed that patients in need of angiography have physical complaints, anxiety and sleep disturbance. The latter agrees with high prevalence of anxiety disorder among cardiac patients (2).

The results of study by Corey Keyes in 2002 also showed that only 17% of cardiac patients evaluated had complete psychiatric health (17). It can be concluded that coronary artery disease, among other cardiac conditions negatively influences psychiatric wellbeing of individuals. In other words, depression is both more prevalent among heart disease patients and also is a condition that can increase heart disease (18).
In a study by the American Women’s Association of America on women with heart disease, it was shown that depression is more prevalent among them particularly if they need invasive procedures such as angiography (19).

Patients’ worries about invasive procedures such as coronary angiography can lead to symptoms of anxiety and even more severe forms of anxiety attacks or various forms of depression. As a result, these patients need psychiatric support.

It was shown that with increased age, score on the GHQ-28 increases. In this study also significant correlation was not found between gender, job, and education level of patients with psychiatric well being. Yet, various studies have shown that increased age, being a man and joblessness are risk factors for cardiovascular disease (17).

This study also showed no correlation between number of angiographies and psychiatric well-being. The latter might be due to small sample size. Of total of 200 patients studied, 175 had angiography for the first time and 25 for the second time.

Results of this study showed that marital status has significant correlation with psychiatric well-being, such that married individuals have better psychiatric health compared to divorced or widowed individuals. It is noted in textbooks that among environmental stressors, death of a spouse has the highest correlation with depression. Additionally, effect of marital status has been shown on anxiety disorders (2). As a result, studies show that being married decreases risk of heart disease (17) and it has positive effect on psychiatric well-being.

This study showed that married individuals have 1.20th the chance of acquiring psychiatric illness compared to divorced or widowed individuals. With a sensitivity of 73.6% and specificity of 75.2% for diagnosing psychiatric illness for the GHQ-28 questionnaire, the latter shows strong influence of a healthy family relationship on decreasing risk of psychiatric disease in coronary artery disease patients and will probably influence course of their illness as well.

Also important in cardiac patients needing angiography is the correlation between psychiatric illness and substance abuse. The prevalence of substance abuse is higher among psychiatric patients and quitting is harder (2). In this study correlation between substance abuse and psychiatric well-being was high. Of the 111 cardiac patients who did psychiatrically well, 26 individuals (23.4%) abused substances; while of the 89 cardiac patients with psychiatric illness 63 individuals (70.8%) abused substances. Among the cardiac patients with psychiatric disorder 5.62% consumed cigarettes alone and 63 individuals (70.7%) abused other substances with cigarettes. Of these individuals, 4.5% used opium alone and 5.4% used heroin and crack. Use of ecstasy and bupronorphine was also found among the study population. Clinical depression appears to be an independent risk factor for incident coronary artery disease for several decades after the onset of the clinical depression (20). Depressive symptoms are a significant risk factor for cardiovascular mortality in older women (21). Clinical depression may be associated with a higher risk of Cardiac Arrest independently of established coronary heart disease risk factors (22). Observational studies suggest that depressive symptoms and major depression are associated with an increased risk of coronary heart disease–related mortality in patients with (23-28) and without (29-36) prior clinical coronary heart disease.

Results showed that only use of heroine and crack had significant correlation with psychiatric illness. In one study it has been shown that smokers above the age of 50 die from coronary artery disease five times more than nonsmokers. Alcohol in moderate amounts protects against cardiovascular disease; yet, in high approach quitting of substances among these coronary artery disease patients. Ways for quitting substances such as nicotine replacement treatment for smokers directly or by decreasing psychiatric disturbance can decrease risk of heart attack and morbidity and mortality.

As a result, psychiatric consultation is recommended for coronary artery disease patients that need invasive procedures to decrease length of disease exacerbation, improve treatment and control anxiety. In addition, this study had some limitations to access to other hospitals and perform the project in a broader area. There would be a hope that further studies achieve more results by accessing to broader areas.

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Author contributions:
Dr Mitra Safa has contributed in study concept and design, critical revision of the manuscript for important intellectual content, administrative, technical and material support and study supervision. Ms Fatemeh Ghassem Boroujerdi has contributed in acquisition of data, analysis and interpretation of data, drafting the manuscript and statistical analysis.

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