Prevalence of Psychiatric Disorders in Patients with Chest Pain Complaints Referred to the Heart Emergency Department of Taleghani Hospital in Tehran, Iran

Parastoo Amiri[1] , Saeed Ganji[2], Farzad Goli[3], Hamid Afshar-Zanjani[4], Amir Ghaffari-Jolfayi[2], Azadeh Sayarifard[5], Fakhri Alsadat Khalifeh-Soltani[6], Marjan Vejdani[7], Maryam Mohseny[8]

[1] Community Medicine Specialist, Shahid Beheshti University of Medical Sciences, Tehran, Iran AND Psychosomatic Researcher of Psychosomatic Research Center of Isfahan University of Medical Sciences, Isfahan, Iran
[2] Student of Medicine, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[3] Professor, Faculty Instructor, Energy Medicine University, California, USA AND Denesh-e Tandorosti Institute, Isfahan, Iran
[4] Professor, Department of Psychiatry, School of Medicine AND Psychosomatic Research Center, Khorshid Hospital, Isfahan University of Medical Sciences, Isfahan, Iran
[5] Associate Professor, Community Medicine Specialist, Community Based Participatory Research Center, Iranian Institute for Reduction of High-Risk Behaviors, Tehran University of Medical Sciences, Tehran, Iran AND Psychosomatic Researcher of Psychosomatic Research Center of Isfahan University of Medical Sciences, Isfahan, Iran
[6] PhD Student of Health Psychology, Behavioral Sciences Research Center AND Psychosomatic Research Center, Isfahan University of Medical Sciences, Isfahan, Iran
[7] Student Research Committee, Mashhad University of Medical Sciences, Mashhad, Iran
[8] Assistant Professor, Community Medicine Specialist, Department of Community Medicine, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran AND Psychosomatic Researcher of Psychosomatic Research Center of Isfahan University of Medical Sciences, Isfahan, Iran

Corresponding Author: Maryam Mohseny*; Assistant Professor, Community Medicine Specialist, Department of Community Medicine, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran AND Psychosomatic Researcher of Psychosomatic Research Center of Isfahan University of Medical Sciences, Isfahan, Iran*
Email: mohseny.maryam0@gmail.com

Quantitative Study

Abstract

Background: Chest pain is one of the most common reasons for people to go to cardiac emergency clinics. This study was conducted with the aim to evaluate the prevalence of psychiatric disorders in patients with chest pain referred to the heart emergency clinic of Taleghani Hospital, Tehran, Iran.

Methods: This descriptive-analytic study was performed on 103 patients with chest pain who were referred to the emergency department. Furthermore, a follow-up was carried out. Data were collected using a demographic information form and mental health survey (28-item General Health Questionnaire; Goldberg & Hillier, 1979) in the two groups of cardiac and non-cardiac chest pain.

Results: Among all the referred patients, 74 patients (71.8%) did not have a definitive diagnosis of cardiovascular disorders (CVDs). The results revealed that among the patients with non-cardiac chest pain, 56 (75.7%), 55 (74.3%), 54 (73%), and 22 (29.7%) individuals had phyisical disorder, anxiety, social dysfunction, and depressive disorder. Among the patients, who were definitively diagnosed with CVDs, 14 (48.3%), 10 (34.5%), 7 (24.1%), and 6 (20.7%) individuals had anxiety, physical disoreder, social dysfunction, and depressive disorder. Among all patients, physical disorder had a significant relationship with gender (P = 0.047), and physical and anxiety disorders had a significant relationship with history of recurrent chest pain in the last 6 months (P < 0.05).

Conclusion: Due to the high number of non-cardiac patients who refer to the emergency department with chest pain complaints, it is recommended that all patients with chest pain complaints be screened for psychiatric diseases.

Keywords: Psychosomatic disorders; Mental disorder; Prevalence; Chest pain

Introduction

Human health is always affected by both physical and mental factors. In recent decades, a new type of illness has been recognized, called psychosomatic disorders in which emotional and psychological factors are involved. According to the definition provided in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), psychosomatic disorders are a broad group of diseases of which physical signs and symptoms are a major component. Physical signs such as cardiovascular, respiratory, gastrointestinal, musculoskeletal, genitourinary, and skin-related symptoms, and dizziness, fatigue, memory impairment, difficulty concentrating, shortness of breath, nausea, vomiting, and insomnia are associated with these disorders (American Psychiatric Association, 2013).

One of the most common causes of referrals to cardiovascular clinics is chest pain (Kasper, Fauci, Hauser, Longo, Jameson, & Loscalzo, 2015). Chest pain is quite common and 25% of the general population experience it at least once in their lifetime (Taylor, 2002). Chest pain can have a cardiac (coronary and non-coronary) or non-cardiac source (Mayou, Bass, & Sharpe, 1995). Studies have shown that in 50 to 80% of patients introduced to cardiologists, chest pain had a non-cardiac cause (Knockaert, Buntinx, Stoens, Bruyninckx, & Delooz, 2002; Zipes, Libby, Braunwald, Bonow, Mann, & Tomaselli, 2019). Different non-cardiac causes can mimic chest pain. Katon et al. (1988) reported anxiety and depression as the most common mental disorders in patients with chronic medical illness. In addition, depression and anxiety can be a risk factor in heart disease (Stewart, Davidson, Meade, Hirth, & Makrides, 2000). Up to 20% of patients with myocardial infarction (MI) had depression at least 6 months before the stroke that had not been take into consideration (Frasure-Smith & Lesperance, 2005). Moreover, anxiety can increase the risk of a heart attack by 5 to 10% (Kuijpers, Honig, Griez, Braat, & Wellens, 2000) the mechanism of which is related to the sympathetic stimulation of the heart and cardiac arrhythmia (Mayou et al., 2000)

About 75% of cardiac specialists do not examine mental disorders such as anxiety, depression, obsession, and physical complaints in patients before and after a heart attack (Castillo-Richmond et al., 2000). The prevalence of psychiatric disorders in patients with chest pain can help increase their quality of life (QOL). Moreover, it can reduce unnecessary diagnostic tests and screening as well as overtreatment, with potentially dangerous side effects.

The present study was conducted with the aim to determine the prevalence of cardiac and non-cardiac causes of chest pain among patients who referred to the cardiac emergency department of Taleghani Hospital in Tehran, Iran, with chest pain.

Methods

This descriptive study was conducted on 103 patients with chest pain without a history of heart disease who referred to the emergency department and heart clinic of Taleghani Hospital. Considering an α of 0.05, accuracy of 0.10, and probability of impact size of 0.50, the sample size was estimated at 100 people. We defined chest pain as a pressure, burning, or numbness in the chest which can be categorized into the cardiac and non-cardiac subgroups. Informed consent was obtained from all patients.

The study inclusion criteria were age of over 18 years and referring to the emergency department of the hospital with chest pain. The exclusion criteria included previous history of cardiovascular disease (CVD) and unwillingness to participate in the study.

This study had 3 main goals:

1- To determine the frequency of CVDs in patients referring to the emergency department with chest pain

   2- To determine the frequency of psychiatric disorders in patients with cardiac and non-cardiac chest pain based on the 4 subscales of the 28-item General Health Questionnaire (GHQ-28) (Physical disorder, Social dysfunction, Depression, and Anxiety disorder)

3- To determine the relationship of gender and recurrent chest pain (in the past 6 months) with psychiatric disorders

All patients were followed up from the time of admission to the emergency room until the final diagnosis by heart specialists.

Demographic information, such as age, sex, and history of CVD, and recurrent chest pain in the past 6 months were assessed using a checklist.

Patients' mental health status was assessed using the GHQ-28.

The GHQ was designed by Goldberg and is one of the most well-known screening tools for mental disorders. It is available in the 12-item, 28-item, 30-item, and 60-item forms (Goldberg & Hillier, 1979). In this study, the 28-item form was used. The questionnaire includes 4 subscales each of which contains 7 questions. Questions 1-7 are related to the scale of physical symptoms and general health status, questions 8-14 are related to the anxiety scale, questions 15-21 are related to the social function disorder scale, and questions 22-28 are related to the depression scale. The validity and reliability of the Persian version of this questionnaire have been confirmed in a study in Iran (Nourbala, Bagheri Yazdi, & Mohammad, 2009).

Frequency and percentage indicators were used to describe the data. The collected data were analyzed using Fisher's exact and chi-square tests with a significance level of 0.05 in SPSS software (version 15; SPSS Inc., Chicago, IL, USA).

Results

The mean ± SD of the participants' age was 50 ± 12.93 years with a minimum of 18 and a maximum of 81 years. Moreover, 63 (60.2%) of the participants in the study were men. In addition, 97.09% of the patients did not have a history of hospitalization in a psychiatric ward, and only 3 patients (2.91%) had a history of hospitalization in a psychiatric ward.

Among the patients with chest pain complaints, 71.8% did not have a definitive diagnosis of CVDs (Table 1).

The results of investigating the frequency distribution of psychiatric disorders in patients with chest pain complaint and the 4 main subscales of the GHQ-28 were as follows:

In total, 72 patients (69.9%) had general health disorders. In addition, 66 patients (64.1%) with chest pain had somatization, 69 patients (67%) had anxiety disorders, 61 patients (59.2%) had social disorders, and 28 patients (27.2%) had depressive disorders.

Among those with mental disorders, the majority had disorders with mild severity; for example, the disorders with the highest prevalence included mild somatization (31.1%), mild anxiety disorders (34%), mild impaired social disorder (41.7%), and mild depression (17.5%) (Table 2).

In the next step, the frequency distribution of psychiatric disorders and the 4 main subscales of the GHQ-28 were investigated in patients with non-cardiac chest pain.

Table 1. Frequency distribution of cardiovascular disorders in patients referred to the emergency department with chest pain complaints

	Status	n (%)
Definite cardiovascular disease diagnosis	Yes	29 (28.2)
	No	74 (71.8)
	Total	103 (100)

Table 2. Frequency distribution of psychiatric disorders in patients with a chest pain complaint

Type of disorder	Presence of disorder	n (%)	The severity of the disorder	n (%)
Physical disorder	No	37 (35.5)	No disturbance	37(35.9)
	Yes	66 (64.1)	Mild	32(31.1)
			Moderate	28(27.2)
			Severe	6(5.8)
Total		103 (100)		103(100)
Anxiety Disorder	No	34 (33)	No disturbance	34(33)
	Yes	69 (67)	Mild	35(34)
			Moderate	31(30.1)
			Severe	3(2.9)
Total		103 (100)		103(100)
Social disorder	No	42 (40.8)	No disturbance	42(40.8)
	Yes	61 (59.2)	Mild	43(41.7)
			Moderate	15(14.6)
			Severe	3(2.9)
Total		103 (100)		103(100)
Depressive Disorder	No	75 (72.8)	No disturbance	75(72.8)
	Yes	28 (27.2)	Mild	18(17.5)
			Moderate	9(8.7)
			Severe	1(1)
Total		103 (100)		103(100)
Total score	No	31 (30.1)	No disturbance	31(30.1)
	Yes	72 (69.9)	Mild	56(54.4)
			Moderate	15(14.6)
			Severe	1(1)
Total		103 (100)		103(100)

The results showed that 62 patients (83.8%) had some degree of general health disorder, they were classified into 4 subgroups of somatization with 56 patients (75.7%), anxiety with 55 patients (74.3%), social dysfunction with 54 patients (73%), and depressive disorder with 22 patients (29.7%). Furthermore, 12 patients (16.2%) had no psychological disorders (Table 3).

Table 3. Frequency distribution of psychiatric disorders in patients with non-cardiac chest pain and the main subscales of the General Health Questionnaire

Type of disorder		n (%)	The severity of the disorder	n (%)
Physical disorder	No	18(24.3)	No disturbance	18(24.3)
	Yes	56(75.7)	Mild	26(35.1)
			Moderate	24(32.4)
			Severe	6(8.1)
Total		74 (100)		74 (100)
Anxiety Disorder	No	19 (25.7)	No disturbance	19 (25.7)
	Yes	55 (74.3)	Mild	25 (33.8)
			Moderate	27 (36.5)
			Severe	3 (4.1)
Total		74 (100)		74 (100)
Social disorder	No		No disturbance	20 (27.0)
	Yes		Mild	38 (51.4)
			Moderate	13 (17.6)
			Severe	3 (4.1)
Total		74 (100)		74 (100)
Depressive Disorder	No		No disturbance	52 (70. 3
	Yes		Mild	13 (17.6)
			Moderate	8 (10.8)
			Severe	1 (1.4)
Total		74 (100)		74 (100)
Total score	No		No disturbance	12 (16.2)
	Yes		Mild	48 (64.9)
			Moderate	13 (17.6)
			Severe	1 (1.4)
Total	No	18(24.3)	No disturbance	18(24.3)

Table 4. Frequency distribution of psychiatric disorders in patients with cardiovascular disorders

Type of disorder		n (%)	The severity of the disorder	n (%)
Physical disorder	No	19 (65.5)	No disturbance	۱۹(65.5)
	Yes	10 (34.5)	Mild	6 (20.7)
			Moderate	4 (13.8)
			Severe	0 (0)
Total		29 (100)		29 (100)
Anxiety Disorder	No	15(51.7)	No disturbance	15 (51.7)
	Yes	14(48.3)	Mild	10 (34.5)
			Moderate	4 (13.8)
			Severe	0 (0)
Total		29 (100)		29 (100)
Social disorder	No	22(75.9)	No disturbance	22 (75.9)
	Yes	7(24.1)	Mild	5 (17.2)
			Moderate	2 (6.9)
			Severe	0 (0)
Total		29 (100)		29 (100)
Depressive	No	23 (79.3)	No disturbance	23 (79.3)
Disorder	Yes	6 (20.7)	Mild	5 (17.2)
			Moderate	1 (3.4)
			Severe	0 (0)
Total		29 (100)		29 (100)
Total score	No	19 (65.5)	No disturbance	19 (65.5)
	Yes	10 (34.5)	Mild	8 (27.6)
			Moderate	2 (6.9)
			Severe	0 (0)
Total	No			29 (100)

Among the patients with chest pain complaints who were definitively diagnosed with CVDs, 14 (48.3%), 10 (34.5%), 7 (24.1%), and 6 patient (20.7%) were, respectively, classified as anxiety disorders, somatizations, social dysfunction, and depressive disorder (Table 4).

According to the results presented in table 5, there was a significant relationship between somatization and gender (P = 0.047), but the presence of anxiety disorder (P = 0.052), social disorders (P = 0.91), and depression (P = 0.67) did not have a significant relationship with gender. In general, there was no significant relationship between the total score of general health and gender (P = 0.14).

Furthermore, there was a significant relationship between complaints of recurrent chest pain in the past 6 months and the prevalence of psychiatric disorders(Table 6).

Table 5. The relationship between gender and prevalence of psychiatric disorders in patients with chest pain

Type of disorder		No	Unknown	Total	Test statistics	P-value
		n (%)	n (%)	n (%)	Chi-square	
Physical	No	27 (73)	10 (27)	37 (100)	94.3	0.047
	Yes	35 (53)	31 (47)	66 (100)		
Anxiety	No	25 (73.5)	9 (36.5)	34 (100)	77.3	0.052
	Yes	37 (53.6)	32 (46.4)	69 (100)		
Social	No	25 (59.5)	17 (40.5)	42 (100)	13.0	0.91
	Yes	37 (60.7)	24 (39.3)	61 (100)		
Depression	No	46 (61.3)	29 (38.7)	75 (100)	15.0	0.67
	Yes	16 (57.1)	12 (42.9)	28 (100)		
Total score	No	22 (71)	9 (29)	31 (100)	15.2	0.14
	Yes	40 (55.6)	32 (44.4)	72 (100)		

Table 6. The relationship between history of recurrent chest pain in the past 6 months and the type of psychiatric disorders in all patients

Type of disorder	Chest pain in the last 6 months	No n(%)	Unknown n(%)	Total n(%)	Test statistics Chi-square	P-value
Physical	No	7(18.9)	30(81.1)	37(100)	9.64	0.002
	Yes	33(50)	33(50)	66(100)		
Anxiety	No	5(14.7)	29(85.3)	34(100)	12.44	< 0.001
	Yes	35(50.7)	34(49.3)	69(100)		
Social	No	12(28.6)	30(71.4)	42(100)	3.14	0.076
	Yes	28(45.9)	33(54.1)	61(100)		
Depression	No	27(36)	48(64)	75(100)	0.93	0.33
	Yes	13(46.4)	15(53.6)	28(100)		
Total score	No	7(22.6)	24(77.4)	31(100)	4.93	0.026
	Yes	33(45.8)	39(54.2)	72(100)		

Discussion

One of the most important objectives of this study was to differentiate between cardiac and non-cardiac patients with chest pain complaints. Subsequently, the rate of mental disorders was examined in these two groups. The most important findings of this study were as follows:

In the specialized follow-up of hospitalized patients, more than half of the patients had non-cardiac chest pain. The majority of patients had general health disorders, and mild disorders had the highest prevalence. The disorders with the highest prevalence, respectively, were mild social dysfunction, anxiety disorder, physical disorder, and depression.

The main assumption that can be drawn from the comparison of the prevalence of mental disorders between the present study and national studies is that although the prevalence of mental disorders in patients referred to clinics may be higher, the prevalence of psychosomatic disorders with the manifestation of chest pain in non-cardiac patients is also very high. In addition, the difference observed in the results of these studies can be attributed to difference in the statistical populations, scoring methods, and diagnostic tools, and changes in the socio-economic status and environment of Iran. Among the patients with chest pain complaints, 28.2% had a definite diagnosis of CVDs, which is lower than previous studies with a prevalence of about 40% (Knockaert et al., 2002, Salehi omran and Asna ashari, 2017). These differences could be due to the selection of patients with stable vital signs, and no history of heart disease and hospitalization in our study.

Nevertheless, the rate of mental disorder in patients with non-cardiac chest pain was higher than the general population in Iran. The first national study of mental disorders in Iran showed that 21% of the population in Iran, aged 15 years and higher, had a mental disorder and the second national study, which used the Schedule for Affective Disorders and Schizophrenia (SADS) as a diagnostic instrument, found the prevalence of mental disorders to be 17.10 (Noorbala et al., 2017b)..

Phyisical disorder One of the subscales of the questionnaire was the somatization that, as seen in the present study, was highly prevalent particularly in individuals with non-cardiac chest pain.

The comparison of the results of the national study by Noorbala et al. (2011) with that of our study showed that the prevalence of suspected somatization in adult Iranians in the national study was 29.8%, almost close to our result in the cardiac group (34.5%), but in the non-cardiac group in our study, the prevalence was considerably

higher (75.5%).

Many studies have shown that psychosomatic disorders are the most common problem in the primary healthcare setting (Alkhadhari, Alsabrrie, Ohaeri, Varghese, Zahid, & Mulsant, 2018). These disorders include interactions between the mind and body, as the brain sends different messages, which influence the individual's consciousness and report a serious problem. There are unknown mental and cerebral mechanisms leading to psychosomatic disorders. The most common psychosomatic disorders are pain in the elbow and knee joints, headache, back pain, constipation, stomach ulcers, menstrual disorders, and arthritis, and many other manifestations that cannot be attributed to a recognized disease.

Social dysfunction

In general, mental health and the ability to perform social roles are characteristics of a healthy person. Social dysfunction is usually caused by a lack of supportive resources and conflict and may extend to family settings and social circles. The results of the current study showed that social dysfunction was one of the most common mental disorders in patients with cardiac and non-cardiac chest pain. These results are consistent with the findings of Maghsoodi, Hesabi, Emami sigaroudi, Kazemnejad leili, and Monfared (2015), Motaghipour et al. (2006), and Noorbala, Bagheri Yazdi, Asadi Lari, and Vaez Mahdavi (2011).

Due to the high prevalence of this disorder both in the general population and patients referred to specialized clinics and considering its potential role in increasing the economic burden on the country, this disorder should be considered seriously by policymakers.

Depression

In the present study, the prevalence of depression was high in both cardiac and non-cardiac patients; however, it was significantly higher in the non-cardiac group. In general, its prevalence was consistent with the findings of other studies.

Depression is the most common mental health problem all over the world and it is expected to become the second leading cause of burden of disease by 2030 (World Health Organization, 2008). Data from the World Research Bank shows that among the women and men in developing countries, depressive disorders account for 30% and 12.6% of mental disorders, respectively (Olfson, Marcus, Druss, Elinson, Tanielian, & Pincus, 2002).

Depression in Iran accounts for a third of the disease burden. Some studies, using the GHQ, showed the prevalence of depression to be 12.02% in students and 19.46% in the general population. The Geriatric Depression Scale (GDS) revealed the prevalence of depression to be 57.58% and 81.85% in older adults living at home and in nursing homes, respectively (Mohamadi et al., 2017)

Anxiety

Anxiety is another common mental disorder which is seen alone or concurrent with depression. According to the World Health Organization, more than half a million people in the world suffer from anxiety disorders and, with a prevalence of about 15.6%, anxiety disorder in women is almost twice as common as men (Noorbala et al., 2017a). The high prevalence of anxiety in our study is consistent with the findings of Safa, Saki, and Matin-rohani (2008), who reported the most common disorders to be psychotic and anxiety disorders. However, it is not consistent with the study by Beheshti et al. (2006), who declared depression to be the most common psychiatric disorder in patients with non-cardiac chest pain. It is also inconsistent with a study in Norway on patients with non-cardiac chest pain that reported a prevalence of 19% and

13% for anxiety disorders and depression, respectively (Haug, Mykletun, & Dahl, 2004). The reason for this difference may be the use of different questionnaires with different cut off points as well as cultural, social, and economic differences of the study environments.

Relationship between Gender and Psychiatric Disorders

One of the important objectives of this study was to differentiate the rate of mental disorders between women and men; information on the mean ± SD scores of the participants on the GHQ-28 and its subscales are presented in table 5. The average physical dysfunction, anxiety, social dysfunction, and depression scores of women and their total GHQ-28 score were higher than that of men and there was a significant relationship between somatization and gender, but anxiety disorder, social disorder, and depression did not have a significant relationship with gender.

The comparison of the results of this study with other studies presented the following results. An important point in the review of other studies was the gender disparities, with a significantly higher prevalence of mental disorders in women. Somatization was more common among women, which is consistent with the findings of Wool and Barsky (1994). According to the Global Burden of Disease study, the prevalence of mental disorder in Iranian women aged 15 to 49 years was estimated at 23% (GHDx, 2017). In a 2015 survey by Hajebi et al. (2018), the prevalence of mental disorders in women was 27.55%, with a 1.38 ratio of women to men. In the 2011 National Survey, the prevalence of mental disorders in Iranian women was 26.5% and the ratio of women to men was estimated at 1.47 times (Sharifi et al., 2015). These studies were performed in the general population, but the current study was performed in a specific group with symptoms of heart pain, which is a possible predisposing factor of mental disorder in this particular population. This may be the cause of the lack of significant difference in terms of gender in the present study.

Conclusion

Due to the higher prevalence of psychiatric disorders in patients with a cardiac diagnosis who require hospitalization, measures such as scheduled appointments and emotional training can significantly help the recovery process of these patients.

Suggestions: It is recommended that all patients with chest pain complaints, regardless of their cardiac and non-cardiac causes, be screened for psychiatric illnesses using accurate and diagnostic tests.

Limitation: In this study, a general health questionnaire was used. The utilization of a screening tool and a secondary diagnostic tool is necessary for the correct diagnosis of disease.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

References

Alkhadhari, S., Alsabrrie, A. O., Ohaeri, J. U., Varghese, R., Zahid, M. A., & Mulsant, B. H. (2018). Mental and physical comorbidity in an Arab primary health care setting. *BMC.Psychiatry, 18*(1), 313. doi:10.1186/s12888-018-1903-8 [doi];10.1186/s12888-018-1903-8 [pii]. Retrieved from PM:30261859

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders: Dsm-5*. Arlington, VA: American Psychiatric Publications.

Beheshti, A., Irajian, G., Darabian, M., Shafaeian, M., Ghorbani, R., Keshavarzian, M. et al. (2006). Determination of frequency and intensity of psychical disorders in patients with chest pain with non-cardiac origin referred to cardiovascular clinics (2004-2005). *Koomesh, 7*(1), 101-106.

Castillo-Richmond, A., Schneider, R. H., Alexander, C. N., Cook, R., Myers, H., Nidich, S. et al. (2000). Effects of stress reduction on carotid atherosclerosis in hypertensive African Americans. *Stroke., 31*(3), 568-573. doi:10.1161/01.str.31.3.568 [doi]. Retrieved from PM:10700487

Frasure-Smith, N., & Lesperance, F. (2005). Reflections on depression as a cardiac risk factor. *Psychosom.Med, 67 Suppl 1*, S19-S25. doi:67/Supplement_1/S19 [pii];10.1097/01.psy.0000162253.07959.db [doi]. Retrieved from PM:15953794

GHDx. (2017). *Global Burden of Disease Study (GBD 2017) Data Resources* [Online]. Available from: URL: http://ghdx.healthdata.org/gbd-2017 (Accessed 2021).

Goldberg, D. P., & Hillier, V. F. (1979). A scaled version of the General Health Questionnaire. *Psychol Med, 9*(1), 139-145. doi:10.1017/s0033291700021644 [doi]. Retrieved from PM:424481

Hajebi, A., Motevalian, S. A., Rahimi-Movaghar, A., Sharifi, V., Amin-Esmaeili, M., Radgoodarzi, R. et al. (2018). Major anxiety disorders in Iran: prevalence, sociodemographic correlates and service utilization. *BMC.Psychiatry, 18*(1), 261. doi:10.1186/s12888-018-1828-2 [doi];10.1186/s12888-018-1828-2 [pii]. Retrieved from PM:30126386

Haug, T. T., Mykletun, A., & Dahl, A. A. (2004). The association between anxiety, depression, and somatic symptoms in a large population: the HUNT-II study. *Psychosom.Med, 66*(6), 845-851. doi:66/6/845 [pii];10.1097/01.psy.0000145823.85658.0c [doi]. Retrieved from PM:15564348

Knockaert, D., Buntinx, F., Stoens, N., Bruyninckx, R., & Delooz, H. (2002). Chest pain in the emergency department: the broad spectrum of causes. Eur J Emerg Med, 9(1), 25-30. Retrieved from PM: 11989492.

Kasper, D. L., Fauci, A. S., Hauser, S. L., Longo, D. L., Jameson, J. L., & Loscalzo, J. (2015). *Harrison's Principles of Internal Medicine* (19th ed.). New York, NY: McGraw-Hill Education.

Katon, W., Hall, M. L., Russo, J., Cormier, L., Hollifield, M., Vitaliano, P. P. et al. (1988). Chest pain: Relationship of psychiatric illness to coronary arteriographic results. *Am.J.Med., 84*(1), 1-9.

Kuijpers, P. M., Honig, A., Griez, E. J., Braat, S. H., & Wellens, H. J. (2000). [Panic disorder, chest pain and palpitations: a pilot study of a Dutch First Heart Aid]. *Ned.Tijdschr.Geneeskd., 144*(16), 745-749. Retrieved from PM:10812442

Maghsoodi, S., Hesabi, M., Emami sigaroudi, A., Kazemnejad leili, E., & Monfared, A. (2015). General health and related factors in employed nurses in Medical-Educational Centers in Rasht. *Holist Nurs Midwifery, 25*(1), 63-72.

Mayou, R., Bass, C. M., & Sharpe, M. (1995). *Treatment of functional somatic symptoms*. Oxford, UK: Oxford University Press.

Mayou, R. A., Gill, D., Thompson, D. R., Day, A., Hicks, N., Volmink, J. et al. (2000). Depression and anxiety as predictors of outcome after myocardial infarction. *Psychosom.Med, 62*(2), 212-219. doi:10.1097/00006842-200003000-00011 [doi]. Retrieved from PM:10772399

Mohamadi, M., Mohaqeqi Kamal, S. H., Vameghi, M., Rafiey, H., Setareh Forouzan, A. & Sajjadi, H. (2017). A meta-analysis of studies related prevalence of depression in Iran. *J Research Health,* 7**,** 581-593.

Motaghipour, Y., Valaei, F., Amiri, P., Emami, H., Mohammad Beygi, F., Hajipour, R. et al. (2006). Study of the general mental health status in an area of Tehran: Tehran Lipid and Glucose Study (TLGS). *Iran J Endocrinol Metab, 7*(4), 301-306.

Noorbala, A. A., Bagheri Yazdi, S. A., Faghihzadeh, S., Kamali, K., Faghihzadeh, E., Hajebi, A. et al. (2017a). A survey on mental health status of adult population aged 15 and above in the province of Razavi Khorasan, Iran. *Arch Iran Med, 20*(11 Suppl. 1), S99-S102. Retrieved from PM:29481140

Noorbala, A. A., Bagheri Yazdi, S. A., Faghihzadeh, S., Kamali, K., Faghihzadeh, E., Hajebi, A. et al. (2017b). A Survey on Mental Health Status of Adult Population Aged 15 and above in the Province of Ardebil, Iran. *Arch Iran Med, 20*(11 Suppl. 1), S11-S14. Retrieved from PM:29481118

Noorbala, A. A., Bagheri Yazdi, S. A., Asadi Lari, M., & Vaez Mahdavi, M. R. (2011). Mental health status of individuals fifteen years and older in Tehran-Iran (2009). *Iran J Psychiatry Clin Psychol, 16*(4), 479-483.

Nourbala, A. A., Bagheri Yazdi, S. A., & Mohammad, K. (2009). The validation of General Health Questionnaire- 28 as a psychiatric screening Tool. *Hakim Res J 11*(4), 47-53.

Olfson, M., Marcus, S. C., Druss, B., Elinson, L., Tanielian, T., & Pincus, H. A. (2002). National trends in the outpatient treatment of depression. *JAMA., 287*(2), 203-209. doi:joc11356 [pii];10.1001/jama.287.2.203 [doi]. Retrieved from PM:11779262

Safa, M., Saki, M., & Matin-Rohani, S. (2008). Study of mental health of the patients who need coronary angiography and its relationship with drug abuse. *Yafteh, 10*(1), 47-53.

Salehi Omran, M. T., & Asna ashari, M. (2017). Evaluation of Coronary Artery Disease in Patients with Atypical Chest Pain Based on Exercise Test. *J Babol Univ Med Sci, 19*(1), 43-47.

Sharifi, V., Amin-Esmaeili, M., Hajebi, A., Motevalian, A., Radgoodarzi, R., Hefazi, M., & Rahimi-Movaghar, A. (2015). Twelve-month prevalence and correlates of psychiatric disorders in Iran: The Iranian Mental Health Survey, 2011. *Arch Iran Med*, 18(2), 76-84. Retrieved from PM: 25644794

Stewart, M., Davidson, K., Meade, D., Hirth, A., & Makrides, L. (2000). Myocardial infarction: survivors' and spouses' stress, coping, and support. *J Adv.Nurs, 31*(6), 1351-1360. doi:jan1454 [pii];10.1046/j.1365-2648.2000.01454.x [doi]. Retrieved from PM:10849146

Taylor, R. B. (2002*). Manual of family practice* (vol. 43). Philadelphia, PA: Lippincott Williams & Wilkins.

Wool, C. A., & Barsky, A. J. (1994). Do women somatize more than men? Gender differences in somatization. *Psychosomatics., 35*(5), 445-452. doi:S0033-3182(94)71738-2 [pii];10.1016/S0033-3182(94)71738-2 [doi]. Retrieved from PM:7972659

World Bank. (2007). *Islamic Republic of Iran health sector review.* Washington, DC; World Bank.

World Health Organization. (2008). *WHO report on the global tobacco epidemic 2008*. Geneva, Switzerland: WHO.

Zipes, D. P., Libby, P., Braunwald, E., Bonow, R. O., Mann, D. L., & Tomaselli, G. F. (2019). *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine*. Philadelphia, PA: Elsevier/Saunders.