

Original Article**Symptoms of anxiety and depression: A comparison among patients with different chronic conditions**

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Abstract

BACKGROUND: Although patients with chronic diseases are at high-risk for symptoms of anxiety and depression, few studies have compared patients with different chronic conditions in this regard. This study aimed to compare patients with different chronic medical conditions in terms of anxiety and depression symptoms after controlling for the effects of socio-demographic and clinical data.

METHODS: This cross-sectional study enrolled 2234 adults, either healthy (n = 362) or patients with chronic medical conditions (n = 1872). Participants were recruited from the outpatient clinic of Baqiyatallah Hospital, Tehran, Iran. Patients had one of the following five medical conditions: coronary artery disease (n = 675), renal transplantation (n = 383), chronic hemodialysis (n = 68), rheumatoid conditions (rheumatoid arthritis, osteoarthritis, systemic lupus erythematosus and ankylosing spondylitis) (n = 666) and viral hepatitis (n = 80). Independent factors included socio-demographic data, pain disability, and somatic comorbidities (Ifudu index). Outcomes included symptoms of anxiety and depression through Hospital Anxiety and Depression Scale (HADS). Two multinomial regression models were used to determine the predictors of anxiety and depression symptoms.

RESULTS: After controlling the effect of age, sex, educational level, comorbidities, disability and pain, rheumatoid arthritis and hepatitis were predictors of higher anxiety symptoms, while coronary artery disease and chronic hemodialysis were predictors of depression symptoms.

CONCLUSIONS: Although all chronic conditions may require psychological consideration; be that as it may, different chronic diseases are dissimilar in terms of their mental health need. Anxiety for rheumatoid arthritis and hepatitis as well as depression for coronary artery disease and chronic hemodialysis is more important.

KEYWORDS: Anxiety, Depression, Chronic Condition, Coronary Artery Disease, Renal Transplantation, Chronic Hemodialysis, Rheumatoid Conditions.

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Patients with chronic diseases are at a higher risk for psychological distress.¹ On the other hand, symptoms of chronic disease are deteriorated in the presence of comorbid anxiety or depressive disorders.^{2,3} Psychological symptoms not only have a substantial negative impact on the quality of life,⁴ but also on the course and outcome of the chronic disorders⁵ as well as on mortality,

morbidity, and service utilization.⁶⁻⁸ The mental distress also plays a role in increasing non-compliance with medical treatment recommendations.⁹

The Hospital Anxiety and Depression Scale (HADS) is designed specifically to detect symptoms of anxiety and depression in medically compromised patients.¹⁰ This questionnaire has been widely employed and trans-

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lated into several languages; a translated-into-Persian version of HADS was also validated for use in Iran.¹¹ This questionnaire was used in outpatient setting in coronary artery disease and renal transplantation.¹²⁻¹⁷

Unfortunately, there is a dearth of research comparing severity of anxiety and depression in patients with different chronic conditions. Those few studies having been hitherto conducted have only probed into two or three chronic conditions.¹⁸ The purpose of the present study was to evaluate the type of chronic somatic disorder which are independent predictor of anxiety and depression symptoms in patients with chronic disorders after controlling confounding, demographic data and health status.

Methods

Design and settings

In this cross-sectional study, we compared the symptoms of anxiety and depression in patients afflicted with one of the five different chronic conditions and healthy subjects, all of whom were selected from the outpatient clinic of Baqiyatallah Hospital in 2006. Baghiatollah hospital was a governmental hospital that its patients came from all parts of the country and covered all insurance types. Patients belonged to all society levels with different income from poor to rich, thus these subjects can represent Iranian patients.

Patients and sampling

Among 2234 participants enrolled, 1872 subjects were patients and 362 were healthy persons without any chronic illnesses. The five chronic medical conditions investigated were coronary artery disease (n = 675), renal transplantation (n = 383), chronic hemodialysis (n = 68), rheumatoid conditions (rheumatoid arthritis, osteoarthritis, systemic lupus erythematosus, ankylosing spondylitis) (n = 666), and viral hepatitis (n = 80). A consecutive sampling method was used to select patients. Healthy subjects were persons in all parts of the city that were selected from public area such as bus or subway stations. These subjects did not

have any of the disease in list of comorbid conditions. The study was approved by the Ethics Committee of Baqiyatallah Hospital and was fully supported and funded by Baqiyatallah University of Medical Sciences.

Process

This study was conducted as a part of a large grant which was described elsewhere.¹⁹ Study team comprised several research assistants mostly general physicians supervised by psychiatrists, psychologists, internists, hepatologist, nephrologists, rheumatologist, and cardiologist. Data collection was done by trained nurses.

Predictors

We registered socio-demographic (age, sex, education level, living place, family income, and marital status), pain, disability and somatic comorbidities (Ifudu index). Patients were assisted in filling HADS if they needed help for any reason including their illiteracy.

Ifudu comorbidity index is a numerical scale to measure somatic comorbidity in patients and has 13 components for evaluation of 13 main body systems. The systems evaluated in this scale are as follows: 1) ischemic heart diseases, 2) other cardiovascular problems, 3) chronic respiratory diseases including asthma or COPD, 4) autonomic neuropathy, 5) other neurologic problems, 6) neuromuscular disorders, 7) infections including HIV, 8) pancreas and biliary diseases, 9) hematological disorders, 10) low back pain, spine or joint disorders, 11) visual disorders (decreased visual acuity up to complete blindness), 12) disorders in limbs and 13) genitourinary diseases. Each item takes a score ranging from 0 (absence of somatic comorbidity) to 3 (severe comorbidity).²⁰

Outcomes

We measured anxiety and depression using the HADS, which is a widely used screening instrument for depression in medically ill patients.¹⁹ This questionnaire consists of 14 statements relevant to generalized anxiety (7 items) and depression (7 items). Each item has

4 possible answers, with scores ranging from zero to 3. The maximum score is 21 for each scale. We also calculated a total HADS score; a higher score indicated more severe symptoms of anxiety and depression.¹⁰

Statistical Analyses

In each study sub-sample, scores of anxiety and depression symptoms were reported as mean \pm standard deviation. Chi-square test was used to compare categorical socio-economic variables between study groups. Age was compared between study groups using ANOVA. To test the possible difference in anxiety and depression in chronic conditions after adjusting for socio-economic and health related variables, two multinomial regression model was used for answering this question. In this model, one of HADS anxiety and depression scores was selected respectively as dependent variable. All different chronic conditions and general population identified with a separate dummy variable, (1) if presented this condition and (0) for the rest. Marital status, sex, education level and any chronic condition were transformed to dummy variables. Because of high missing data in family income, insurance, job and living place, these were dropped from analyzing.

Forward (Likelihood ratio) procedure was used for the regression. Variables were entered to our model if they had significant level lower than 0.050. Statistical analyses were done using

the SPSS software, version 13 (SPSS Inc. Chicago Ill). P-value less than 0.050 considered as significant.

Results

The study population comprised 1365 (52.4%) males and 1242 (47.6%) females, of whom 2030 (77.9%) were married. With respect to education level, 1217 (46.7%) subjects held at least a high school diploma. These demographic characteristics were significantly different among chronic conditions ($p < 0.001$) (Table 1).

Demographic correlates of HADS scores

Age: Pearson correlation test failed to show significant correlation between age and anxiety symptoms in any of the study groups comprising the rheumatologic disorders ($r = 0.057$, $p = 0.145$), kidney transplant recipients ($r = 0.043$, $p = 0.407$), chronic hemodialysis ($r = 0.069$, $p = 0.581$), viral hepatitis ($r = -0.087$, $p = 0.444$), coronary artery disease ($r = -0.037$, $p = 0.384$), and healthy subjects ($r = -0.036$, $p = 0.504$).

Pearson correlation test revealed significant correlation between age and depression symptoms in rheumatologic disorders ($r = 0.115$, $p = 0.003$), kidney transplant recipients ($r = 0.174$, $p = 0.001$), and chronic hemodialysis ($r = 0.278$, $p = 0.024$). However, there was not such significant association in viral hepatitis ($r = -0.072$, $p = 0.526$), coronary artery disease ($r = -0.047$, $p = 0.224$) and healthy subjects ($r = -0.050$, $p = 0.350$).

Table 1. Demographic characteristics in patients with different chronic conditions and healthy subjects

	Age (year)	male		Diploma or higher		Married		Having Job		Having Insurance	
		N	%	N	%	N	%	N	%	N	%
		Healthy subjects	32.41 \pm 8.13	195	14.3	287	77.2	252	67.7	288	79.8
Coronary artery disease	56.44 \pm 12.73	573	42	309	35.7	733	84.6	254	39.4	*	*
Kidney Transplantation	39.82 \pm 13.25	322	23.5	234	47.7	352	71.7	210	54.8	352	92
Chronic hemodialysis	55.17 \pm 14.24	35	2.6	29	42.6	46	67.6	23	33.8	61	89.7
Rheumatologic conditions	46.15 \pm 12.71	127	9.3	269	40.4	546	82	152	22.8	0	0
Viral hepatitis	41.92 \pm 10.33	113	8.3	89	61.8	101	70.1	*	*	*	*
P-value	< 0.001	< 0.001		< 0.001		< 0.001		NC		NC	

* Value of cell was missing

NC: P-value was not calculated due to the data missing

Table 2. Adjusted odds ratio and 95% confidences interval based on multiple regression results of independent predictors of anxiety symptoms in patients with somatic chronic disorders

	B	P-value	95% Confidences interval	
Age	0.034	< 0.001	.021	.048
Sex	-0.998	< 0.001	-1.382	-.614
Education	0.418	0.030	.040	.796
Comorbidity Score	0.086	< 0.001	.050	.121
Disability	0.069	< 0.001	.059	.080
Pain	0.022	< 0.001	.614	1.382
Rheumatoid arthritis	1.290	< 0.001	.876	1.704
Hepatitis	1.346	0.005	.412	2.279

Sex: Mean anxiety score was significantly different among male and female patients in coronary artery disease (5.85 ± 5.24 in males, 9.33 ± 6.24 in females, $p < 0.001$), but not those with chronic hemodialysis (7.65 ± 3.86 in males, 8.15 ± 4.50 in females, $p = 0.665$), kidney transplant recipients (6.18 ± 4.15 in males, 7.85 ± 4.50 in females, $p = 0.193$), rheumatologic disorders (7.44 ± 4.48 in males, 9.42 ± 4.18 in females, $p = 0.433$), viral hepatitis (7.71 ± 4.64 in males, 8.25 ± 3.62 in females, $p = 0.155$) and healthy subjects (5.47 ± 4.15 in males, 7.34 ± 4.59 in females, $p = 0.144$).

Mean depression score was significantly different among male and female patients with kidney transplant recipients (6.20 ± 4.22 in males, 6.44 ± 4.77 in females, $p = 0.033$), but not among those with coronary artery disease (4.58 ± 3.37 in males, 6.26 ± 3.26 in females, $p = 0.410$), chronic hemodialysis (8.00 ± 4.62 in males, 9.09 ± 4.78 in females, $p = 0.825$), rheumatologic disorders (6.32 ± 3.77 in males, 7.25 ± 3.83 in females, $p = 0.936$), viral hepatitis (5.53 ± 3.87 in males, 4.75 ± 3.37 in females, $p = 0.138$) and healthy subjects (5.14 ± 3.79 in males, 5.66 ± 3.82 in females, $p = 0.608$).

Multivariable regression analysis

A multinomial regression model was used to

assess effects of chronic disorders type on anxiety in patients with chronic conditions. After entering variables into the model, age, sex, educational level, comorbidity score, disability, pain, Rheumatoid arthritis and hepatitis remained in the model. In the other word, some types of chronic disorder (Rheumatoid arthritis and hepatitis) cause anxiety in patients with chronic conditions.

A multinomial regression model was used to assess effects of chronic disorders type on depression in patients with chronic conditions. After entering variables into the multivariable model, age, educational level, disability, pain, coronary artery disease and chronic hemodialysis remained in the model. In the other word, among different chronic conditions, coronary artery disease and chronic hemodialysis were associated with higher depression symptoms.

Discussion

We found that Rheumatoid arthritis and viral hepatitis, in addition to age, sex, educational level, comorbidity score, disability and pain are predictors of anxiety while coronary artery disease and chronic hemodialysis in addition to age, educational level, disability and pain independently predicts symptoms of depression.

Table 3. Adjusted odds ratio and 95% confidences interval based on multiple regression results of independent predictors of depression symptoms in patients with somatic chronic disorders

	B	P	Confidences interval	
Age	0.013	0.030	0.001	.025
Education	0.726	< 0.001	0.419	1.033
Disability	0.042	< 0.001	0.034	0.050
Pain	0.016	< 0.001	0.010	0.021
Coronary artery disease	-0.158	< 0.001	-.173	-.144
Dialysis	1.722	< 0.001	1.379	2.066

Based on the literature, patients with chronic diseases tend to experience higher levels of depression^{21,22} and anxiety^{23,24} than healthy people. Koopmans and Lamers reported that the number of chronic conditions affect the level of psychological distress; however, they did not report the impact of various chronic conditions.²⁵

We noted that the chronic viral hepatitis and rheumatoid arthritis were linked to higher anxiety than coronary artery disease, renal transplantation, chronic hemodialysis, osteoarthritis, systemic lupus erythematosus, and ankylosing spondylitis. High anxiety symptoms in hepatitis patients were reported elsewhere²⁶ which may be due to the fact that the patients fear the spread of the disease or reaction of their relatives to the disease.

It has been reported that rheumatologic patients are prone to severe depression and anxiety levels.²⁷ We had previously showed that patients with rheumatoid arthritis have a poor quality of life.^{28,29} VanDyke et al. noted that individuals with rheumatoid arthritis exhibit higher levels of anxiety than healthy people.³⁰ Waheed et al. reported that two-thirds of patients with chronic rheumatologic disorders suffer from a concomitant mood disorder including anxiety.³¹

Our results showed that coronary artery disease and chronic hemodialysis caused a higher depression in patients with chronic somatic conditions. According to the literature, depression symptoms are as the most common

psychiatric abnormality in hemodialysis patients.^{32,33} This may lead to suicide at a rate of 100- to 400-fold greater than that in the general population.³⁴ Other studies had similar findings that depression symptoms were seen more in patients with coronary artery disease.^{35,36}

The present study had some limitations. First, we measured the symptoms of anxiety and depression, not the presence of anxiety or depression disorders based on diagnostic manuals. Second, we only enrolled patients with one of the five important chronic conditions; the inclusion of patients with other conditions could potentially affect our findings. Third, the study was restricted to a single center, making the external generalizability of our findings to other countries uncertain.

Conclusion

Although all chronic conditions do require psychological consideration, each chronic disease imposes a unique need. Anxiety in rheumatoid arthritis and hepatitis as well as depression in coronary artery disease and chronic hemodialysis is more important. This information can be used by physicians and health care providers.

Acknowledgement

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Conflict of Interests

Authors have no conflict of interests.

Authors' Contributions

The authors had the same contribution in various procedures performed in this project.

References

1. Verhaak PF, Heijmans MJ, Peters L, Rijken M. Chronic disease and mental disorder. *Soc Sci Med* 2005; 60(4): 789-97.
2. Ciechanowski PS, Katon WJ, Russo JE, Hirsch IB. The relationship of depressive symptoms to symptom reporting, self-care and glucose control in diabetes. *Gen Hosp Psychiatry* 2003; 25(4): 246-52.

3. Ludman EJ, Katon W, Russo J, Von KM, Simon G, Ciechanowski P, et al. Depression and diabetes symptom burden. *Gen Hosp Psychiatry* 2004; 26(6): 430-6.
4. Gladis MM, Gosch EA, Dishuk NM, Crits-Christoph P. Quality of life: expanding the scope of clinical significance. *J Consult Clin Psychol* 1999; 67(3): 320-31.
5. Levenson JL. Psychosocial interventions in chronic medical illness. An overview of outcome research. *Gen Hosp Psychiatry* 1992; 14(6 Suppl): 43S-9S.
6. Haarasilta L, Marttunen M, Kaprio J, Aro H. Major depressive episode and health care use among adolescents and young adults. *Soc Psychiatry Psychiatr Epidemiol* 2003; 38(7): 366-72.
7. Wells KB, Stewart A, Hays RD, Burnam MA, Rogers W, Daniels M, et al. The functioning and well-being of depressed patients. Results from the Medical Outcomes Study. *JAMA* 1989; 262(7): 914-9.
8. Charlson M, Peterson JC. Medical comorbidity and late life depression: what is known and what are the unmet needs? *Biol Psychiatry* 2002; 52(3): 226-35.
9. DiMatteo MR, Lepper HS, Croghan TW. Depression is a risk factor for noncompliance with medical treatment: meta-analysis of the effects of anxiety and depression on patient adherence. *Arch Intern Med* 2000; 160(14): 2101-7.
10. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983; 67(6): 361-70.
11. Montazeri A, Vahdaninia M, Ebrahimi M, Jarvandi S. The Hospital Anxiety and Depression Scale (HADS): translation and validation study of the Iranian version. *Health Qual Life Outcomes* 2003; 1: 14.
12. Abbas TS, Ebrahimi M, Shamspour N, Assari S. Effect of depression on health care utilization in patients with end-stage renal disease treated with hemodialysis. *Eur J Intern Med* 2009; 20(4): 411-4.
13. Saleh DK, Nouhi S, Zandi H, Lankarani MM, Assari S, Pishgou B. The quality of sleep in coronary artery disease patients with and without anxiety and depressive symptoms. *Indian Heart J* 2008; 60(4): 309-12.
14. Bahaeloo-Horeh S, Assari S. Students experience self-esteem improvement during mountaineering. *Wilderness Environ Med* 2008; 19(3): 181-5.
15. Kazemi-Saleh D, Pishgou B, Farrokhi F, Fotros A, Assari S. Sexual function and psychological status among males and females with ischemic heart disease. *J Sex Med* 2008; 5(10): 2330-7.
16. Kazemi-Saleh D, Pishgou B, Assari S, Tavallai SA. Fear of sexual intercourse in patients with coronary artery disease: a pilot study of associated morbidity. *J Sex Med* 2007; 4(6): 1619-25.
17. Noohi S, Khaghani-Zadeh M, Javadipour M, Assari S, Najafi M, Ebrahimi M, et al. Anxiety and depression are correlated with higher morbidity after kidney transplantation. *Transplant Proc* 2007; 39(4): 1074-8.
18. Smith MS, Martin-Herz SP, Womack WM, Marsigan JL. Comparative study of anxiety, depression, somatization, functional disability, and illness attribution in adolescents with chronic fatigue or migraine. *Pediatrics* 2003; 111(4 Pt 1): e376-e381.
19. Einollahi B, Bahaeloo-Horeh S, Assari S, Ghanei M. Iranian Kidney Transplantation Society seeks to answer its questions through a link between scientists and young researchers. *Saudi J Kidney Dis Transpl* 2008; 19(6): 1015-9.
20. Ifudu O, Paul HR, Homel P, Friedman EA. Predictive value of functional status for mortality in patients on maintenance hemodialysis. *Am J Nephrol* 1998; 18(2): 109-16.
21. Berkman LF, Berkman CS, Kasl S, Freeman DH, Jr., Leo L, Ostfeld AM, et al. Depressive symptoms in relation to physical health and functioning in the elderly. *Am J Epidemiol* 1986; 124(3): 372-88.
22. Palinkas LA, Wingard DL, Barrett-Connor E. Chronic illness and depressive symptoms in the elderly: a population-based study. *J Clin Epidemiol* 1990; 43(11): 1131-41.
23. Viney LL, Westbrook MT. Psychological reactions to chronic illness-related disability as a function of its severity and type. *J Psychosom Res* 1981; 25(6): 513-23.
24. Nickel JT, Brown KJ, Smith BA. Depression and anxiety among chronically ill heart patients: age differences in risk and predictors. *Res Nurs Health* 1990; 13(2): 87-97.
25. Koopmans GT, Lamers LM. Chronic conditions, psychological distress and the use of psychoactive medications. *J Psychosom Res* 2000; 48(2): 115-23.
26. Chen X, Yang L. [Anxiety and depression in patients with viral hepatitis]. *Zhonghua Yi Xue Za Zhi* 2002; 82(6): 398-9.
27. Bagnato G, De Filippis LG, Caliri A, Bruno A, Gambardella N, Muscatello MR, et al. [Comparison of levels of anxiety and depression in patients with autoimmune and chronic-degenerative rheumatic: preliminary data]. *Reumatismo* 2006; 58(3): 206-11.
28. Alishiri GH, Bayat N, Salimzadeh A, Salari A, Hosseini SM, Rahimzadeh S, et al. Health-related quality of life and disease activity in rheumatoid arthritis. *Journal of Research in Medical Sciences* 2011; 16(7): 897-903.
29. Alishiri GH, Bayat N, Fathi AA, Tavallai SA, Assari S, Moharamzad Y. Logistic regression models for predicting physical and mental health-related quality of life in rheumatoid arthritis patients. *Mod Rheumatol* 2008; 18(6): 601-8.
30. VanDyke MM, Parker JC, Smarr KL, Hewett JE, Johnson GE, Slaughter JR, et al. Anxiety in rheumatoid arthritis. *Arthritis Rheum* 2004; 51(3): 408-12.

31. Waheed A, Hameed K, Khan AM, Syed JA, Mirza AI. The burden of anxiety and depression among patients with chronic rheumatologic disorders at a tertiary care hospital clinic in Karachi, Pakistan. *J Pak Med Assoc* 2006; 56(5): 243-7.
32. Israel M. Depression in dialysis patients: a review of psychological factors. *Can J Psychiatry* 1986; 31(5): 445-51.
33. Watnick S, Kirwin P, Mahnensmith R, Concato J. The prevalence and treatment of depression among patients starting dialysis. *Am J Kidney Dis* 2003; 41(1): 105-10.
34. Abram HS, Moore GL, Westervelt FB, Jr. Suicidal behavior in chronic dialysis patients. *Am J Psychiatry* 1971; 127(9): 1199-204.
35. Stafford L, Berk M, Jackson HJ. Validity of the Hospital Anxiety and Depression Scale and Patient Health Questionnaire-9 to screen for depression in patients with coronary artery disease. *Gen Hosp Psychiatry* 2007; 29(5): 417-24.
36. Moller-Leimkuhler AM. Women with coronary artery disease and depression: a neglected risk group. *World J Biol Psychiatry* 2008; 9(2): 92-101.

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