

Association of anxiety, depression, and psychological distress in people with and without functional dyspepsia

Peyman Adibi, Ammar Hasanzadeh Keshteli, Hamed Daghighzadeh, Hamidreza Roohafza¹, Nasim Pournaghshband, Hamid Afshar²

Integrative Functional Gastroenterology Research Center, ¹Cardiac Rehabilitation Research Center, Cardiovascular Research Institute, ²Psychosomatic Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

Abstract

Background: Current studies have indicated a high ratio of psychological problems in functional dyspepsia (FD) which causes disturbance in its management, so recognition these problems help the process of treatment.

Materials and Methods: This was a cross-sectional study with a sample size of 4763 carried out in Isfahan University of Medical Sciences in 2011. Modified ROME III questionnaire was used to evaluate FD symptoms. Hospital anxiety and depression scale and 12-item General Health Questionnaire-12 was used to assess the psychological issue. Logistic regression analysis was used to assess the association of psychological problems and FD.

Results: We showed that overly 654 (13.7%), 1338 (28.1%), and 1067 (22.4%) of participants, respectively had anxiety, depression, and of psychological distress. Seven hundred and ten (15.5%) participants were diagnosed with FD. Of all participants Mean scores of anxiety ($P < 0.001$), depression ($P < 0.001$), and psychological distress ($P < 0.001$) in participants with FD were significantly more than those with no FD. Multivariate logistic regression analysis showed that psychological problems, whether in the form of psychological distress odds ratio (OR): 2 (95% confidence interval [CI]: 1.3–3) and OR: 1.3 (95% CI: 1.1–1.7) in males and females, respectively, anxiety OR: 2.4 (95% CI: 1.5–3.9) and OR: 2.3 (95% CI: 1.7–3.2) in males and females, respectively) or depression OR: 2.2 (95% CI: 1.5–3.3) and OR: 1.7 (95% CI: 1.3–2.3) in males and females, respectively) were significantly linked to FD in both genders.

Conclusions: The prevalence of FD is less in males than females, but psychological links were stronger in males. Thus, it is essential to consider and detect the psychological distress in these patients.

Key Words: Anxiety, depression psychological distress, functional dyspepsia

Address for correspondence:

Dr. Hamid Afshar, Department of Psychiatry, Isfahan University of Medical Sciences, P. O. Box 81746-73461, Isfahan, Iran. E-mail: shafsharz@gmail.com

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INTRODUCTION

Functional dyspepsia (FD) is the umbrella term that refers to unexplained dyspepsia, i.e., no structural

explanation on standard investigations. FD is defined as the presence of one or more dyspepsia symptoms that are considered to originate from the gastroduodenal region,

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in the absence of any organic, systemic, or metabolic disease that is likely to explain the symptoms.^[1] FD comprise the biggest part of gastrointestinal (GI) disorders^[2] characterized by upper GI symptoms such as bothersome postprandial fullness, early satiety, and epigastric pain or burning for 12 weeks or more began within the last six months with no evidence of structural pathologies.^[3,4] Its prevalence across most populations has been 10–40%.^[5-7] The recorded prevalence in our country has been approximately 3–30%. If predominant heartburn is not included in dyspepsia, then approximately 20–30% of people in the community each year report chronic or recurrent dyspeptic symptoms and this percentage is reasonably consistent around the world.^[3] The pathophysiology of FD has been vastly investigated. It seems psychological problems are primarily responsible for the appearance of the disease.^[6,8,9] It means life distress, anxiety, and/or depression might determine the emergence, persistence or severity of such FD.^[10] Approximately, one in two subjects, it is estimated, seek health care for their dyspeptic symptoms at some time in their life. Pain severity and anxiety (including fear of serious disease) appear to be factors associated with consulting behavior.^[3] There is a few evidence of association of dyspepsia with psychopathological factors and comorbidity with psychiatric disorders, especially anxiety disorders. One study in china demonstrated that FD patients had significantly higher mean scores for anxiety and depression than Normal population, and the prevalence of anxiety and depression were also higher among FD patients. Anxiety is possibly one of the important reasons for FD patients to ask for medical consultation.^[11] It is still unclear whether these psychopathological factors determine health care-seeking behavior, whether they play a key role in the pathophysiology of the dyspepsia symptom complex, or whether they reflect a common predisposition for functional and psychological disorders. Abnormalities of several psychosocial dimensions were found to be associated with epigastric pain and with hypersensitivity to gastric distention in FD.^[3] Due to different socio-economic and cultural characteristics of our population than those of the Western countries, and the scarcity of the related population-based studies in the Middle East, their psychological profile, and health-care seeking behavior could be different and needs more evaluation.

Although one study in Iran showed that the prevalence of FD was about 16% and it was significantly associated with anxiety and depressive disorder.^[12] The current study was carried out to find the association of psychological distress in employees of Isfahan University of Medical Sciences (IUMS) who were diagnosed as FD and no FD.

MATERIALS AND METHODS

Study design and participants

Data were collected from the project of the study on the Epidemiology of Psychological, Alimentary Health and Nutrition that was a cross-sectional study and published in 2011. The details of information about methodology have been explained in the study of SEPAHAN. The participants were nonacademic staff members of IUMS, who were working in different sections that affiliated with IUMS.

Base on cluster random sampling, a sample was selected within 20,000 nonacademic employees that working in 50 different centers across Isfahan province. The data were gathered in two separate steps to increase the accuracy of data collection that self-administered questionnaires for psychological information were applied in the second step. In the current analysis, we used data from 4763 adults who had completed information on digestive problems and psychological problems such as anxiety, depression, and mental health.^[13]

The study was approved by the Medical Research Ethics Committee (project number, 189069, 189082 and 189086). There was no obligation to take part in the study. The written consent form was signed by the participants.

Variable assessment

We used the modified Rom III questionnaire to assess the presence or absence of different symptoms of FDs including dyspepsia, irritable bowel syndrome, abdominal pain, functional constipation, and functional diarrhea. The questionnaire was used in the study of SEPAHAN. A questionnaire to investigate symptoms of FGIDs: Rome III questionnaire 6 in its complete form and additional questions from Talley bowel disease questionnaire. During the face validation of this questionnaire, they found that most participants could not discriminate the difference between the rating scales used in Rome III. Therefore, they modified the rating scale to a 4-item rating scale (never or rarely, sometimes, often, and always for each question).^[14] The diagnosis of FD was based on the questionnaire filled out individually.

Anxiety and Depression were evaluated by the validated hospital anxiety and depression scale. The questionnaire includes 14 items that could be divided into two. Both scales consisted of seven items with a score ranging from 0 to 21. Higher scores show more anxiety and more depression. Threshold (cut) points for clinical levels of anxiety and depression were set at a score of ≥ 11 . Cronbach's alpha coefficient has been

found to be 0.78 for the anxiety subscale and 0.86 for depression sub-scale.^[15,16]

Psychological distress was measured by the Iranian validated version of General Health Questionnaire (GHQ-12) item.^[17,18] GHQ-12 is a consistent and reliable instrument for use in general population studies. Each item was rated on a four-point scale (less than usual, no more than usual, fairly more than usual and much more than usual). The system used to score the GHQ-12 questionnaires was the 0-0-1-1 method. Using this method, a participant could have been scored between 0 and 12 points; a score of 4 or more was used to identify a participant with high distress level. Cronbach's alpha coefficient has been found to be 0.87.^[18]

Statistical analysis

The Statistical Package for the Social Sciences version 15.0 (SPSS Inc., Chicago, IL, USA) was used for statistical analyzes was used for data analysis. Continuous variables were presented as mean (standard deviation). Mann-Whitney U-test and Student's *t*-test were applied to analyze nonparametric and parametric continuous variables, respectively. The prevalence of FD according to sex, age, education, marital status, and psychological problems were calculated and presented as numbers and percents. Descriptive differences in the distribution of categorical variables among different groups were analyzed using Chi-square test. Two-tailed $P < 0.05$ was considered significant.

Association of FD and psychological problems of the study population was studied. Univariate analysis was used to evaluate single variable crude effects on FD. The risk factors included age, sex, education, marital status, and psychological problems. Stepwise logistic regression analysis was applied to assess their adjusted effects on the outcome (FD) in different genders. The odds ratios (ORs) and the 95% confidence intervals (CI) were calculated in the logistic regression analysis. The ORs (95% CI) >1 indicates that the employees with the corresponding variable(s) are more likely to suffer from the FD. The odds ratios (95% CI) <1 indicates that the employees with the corresponding variable(s) are less likely to suffer from FD. The 10% significance level was considered for exclusion from the model.

RESULTS

Overall picture

In this study, 4763 participants with mean age (36.87 ± 8.09) were included the 2106 males and 2657 females. 3776 (81.2%) employers married and 874 (18.8%) subjects were unmarried. 1986 (42.8%)

were undergraduate, and 2650 (57.2%) subjects were a graduate. One out of every six females (17%) and one out of every eight male (12%) suffered from FD ($P < 0.001$). Regardless of sex, 14.9 and 15.3% of single and married people had FD, respectively. The difference was not significant. 11.05% and 15.6% of people aged <40 and ≥ 40 years had FD, respectively ($P < 0.043$). The distribution of FD according to the education was significantly different; i.e., 12.75% and 18.4% of graduates and undergraduates had FD ($P < 0.001$), respectively. Profiles of psychological problems of employees in the two genders are demonstrated in Table 1.

The prevalence of FD according to anxiety, depression, and psychological distress in both genders is presented in Table 2. Overall, 1711 people (37.3%) had anxiety, depression or psychological distress. 710 people (15.5%) suffered from FD [Figure 1], of which 461 ones (65%) had anxiety, depression or psychological distress (OR =3.9, 95% CI: 3.3-4.6), 242 employees had depression and distress (OR =3.5, 95% CI: 2.9-4.9), 223 ones had depression and anxiety (OR =4.95, 95% CI: 4.1-6), 181 people had anxiety and distress (OR =4.6, 95% CI: 3.75-5.7), and 167 (23.5%) employees had anxiety, depression and distress (OR =4.6, 95% CI: 3.75-5.7). The mean scores of anxiety, depression and GHQ are presented in Table 2. Both in males and females with FD, mean scores of anxiety, depression and GHQ were significantly more than those with no FD. Furthermore, females with and without FD had significantly higher anxiety, depression, and psychological distress than males with FD and males with no FD, respectively [Table 2]. In summary, people with FD were more depressed, anxious or distressed than people with no FD; and females regardless of FD status were more frequently and more deeply depressed, anxious or distressed than males. [Table 3]

In univariate analyses, age ≥ 40 (OR =0.82, 95% CI: 0.68-0.99), education (OR =0.65, 95% CI: 0.55-0.76), anxiety, depression, and psychological distress were all found significantly associated with FD in both genders [Table 4]. Female (OR =1.44, 95% CI: 1.22-1.7) was also significantly associated with FD. In multiple logistic regression analysis, all of the above-mentioned variables along with marital status were considered in the model in different genders. Age and education lost their significance [Table 4].

DISCUSSION

The present study demonstrated that FD patients had significantly higher mean scores for anxiety, depression and psychological distress, than people without FD. Females with and without FD had significantly higher

Table 1: Demographic table of studied population in both genders

Variables	Males FD (%)		P	Females FD (%)		P
	Yes	No		Yes	No	
Age						
≥40	131 (11.3)	1035 (88.7)	0.36	355 (17.9)	1620 (82.1)	0.05
<40	113 (12.5)	798 (87.5)		94 (14.8)	556 (85.2)	
Educational						
Undergraduate	161 (14.3)	963 (85.7)	0.009	204 (23.7)	658 (76.3)	<0.0001
Graduate	96 (10.4)	825 (89.6)		242 (14)	1487 (86)	
Marital status						
Married	222 (12.3)	1590 (87.7)	0.03	356 (18.1)	1608 (81.9)	0.01
Single	41 (16.7)	204 (83.3)		89 (14.1)	540 (85.9)	

FD: Functional dyspepsia

Table 2: Prevalence of psychological problems in both genders compared between the patients with FD and those with no FD by Chi-square test

Variables	Males (%)		P	Females (%)		P
	FD	No FD		FD	No FD	
Anxiety						
Yes	76 (29.5)	128 (7.2)	<0.001	176 (38.9)	274 (12.7)	<0.001
Depression						
Yes	129 (49.8)	325 (18.2)	<0.001	255 (56.4)	629 (29.2)	<0.001
Psychological distress						
High	105 (40.4)	262 (14.8)	<0.001	199 (44.4)	501 (23.2)	<0.001

FD: Functional dyspepsia

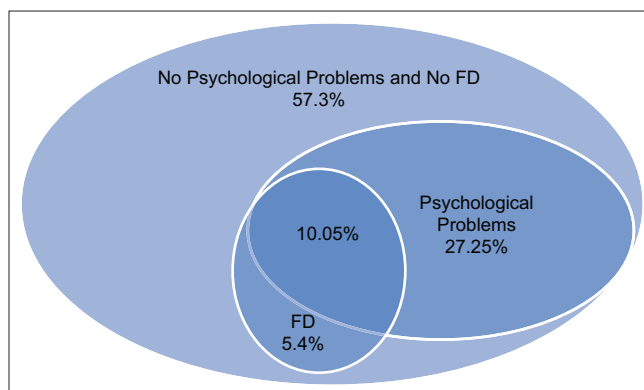
Table 3: Comparison of mean±SD scores of anxiety, depression and GHQ in both genders compared using t-test

Psychological problems	Males		P	Females		P
	FD	No FD		FD	No FD	
Anxiety score	6.0±4.3	2.5±3.0	<0.001	6.7±4.5	3.5±3.5	<0.001
Depression score	8.0±4.0	5.2±2.9	<0.001	8.6±3.6	6.2±3.2	<0.001
GHQ score	3.3±3.2	1.5±2.3	<0.001	3.8±3.3	2.1±2.7	<0.001

FD: Functional dyspepsia, SD: Standard deviation, GHQ: General Health Questionnaire

anxiety, depression, and psychological distress than males with FD and males with no FD, respectively. Accordingly, people with FD were more depressed, anxious or distressed than people with no FD; and females regardless of FD status were more frequently and more deeply depressed, anxious or distressed than males.

In all three evaluated aspects, anxiety-depression and psychological distress, males had bigger ORs than females. Hence, it seems males with FD are more affected by psychological distress than females. The links between FD and anxiety and/or depression, in different samples such as general population,^[19] veterans,^[20] and GI patients referred for endoscopy^[21] have been shown. They similarly investigated the relationship of uninvestigated FD and anxiety and/or depression. Furthermore, this association has been recorded in long-term follow-ups,^[22,23] case-control studies,^[24,25] and clinical trials.^[26,27]

**Figure 1:** The overlaps of distribution of people with functional dyspepsia and those with anxiety, depression or distress in total study population

The present study also revealed the relationship between FD and psychological distress. Distress was recognized as a predictor of FD in many studies.^[25,28-30] The proposed mechanism is the modulation of GI function and motility^[30-32] and emotional influence of distress.^[25,33,34] In addition, patients with depression or somatoform disorders may have early satiety, epigastric pain or burning, and postprandial fullness and thus might be diagnosed with FD. Three different studies conducted in Australia, Sweden, and the Netherlands demonstrated that FD was associated with somatic complaints and psychological illness.^[35,36] The findings of a study in Iran, congruent with

Table 4: Univariate and multivariate logistic regression analyses to reflect the crude and the adjusted effects of anxiety, depression and psychological distress on FD in both genders

Variables	OR (95% CI)			
	Males		Females	
	Crude effect	Adjusted effect**	Crude effect	Adjusted effect**
Distress	3.9 (2.9-5.1)*	2 (1.3-3)*	2.6 (2.1-3.3)*	1.3 (1.1-1.7)*
Anxiety	5.4 (3.9-7.5)*	2.4 (1.5-3.9)*	4.4 (3.5-5.5)*	2.3 (1.7-3.2)*
Depression	4.5 (3.4-5.8)*	2.2 (1.5-3.3)*	3.1 (2.5-3.9)*	1.7 (1.3-2.3)*
Age		0.98 (0.65-1.46)		0.67 (0.47-0.95)*
Education		0.8 (0.54-1.17)		0.56 (0.42-0.75)*
Marital statuses		1.66 (0.91-3.00)		0.81 (0.70-0.92)*

*Significant association, **Adjusted based on age, education and marital status. OR: Odds ratio, CI: Confidence interval, FD: Functional dyspepsia

our study, showed that the prevalence of FD was about 16%, and it was significantly associated with anxiety and depressive disorder; although it was slightly greater among females and peaked in the age group 25–34 years old.^[12]

In addition to a study in china, the results demonstrated all FD patients had significantly higher mean scores for anxiety and depression than Chinese Normal people Norm score, and the prevalence of anxiety and depression were also higher among FD patients. The prevalence of anxiety and depression is reflective of FD patients who were more likely to consult for their digestive symptoms. Anxiety is possibly one of the important reasons for FD patients to ask for medical consultation.^[11] FD has been recognized as a heterogeneous disorder.^[22,37-39] Then, more specific multi-center long-term cohort studies with inclusion of all contributing variables are necessary to illuminate these relationships and consequently, identify the patients who may benefit from the appropriate interventions.

The following limitations of the current study should be addressed. First, in self-administered questionnaires, the subjects with chronic pain are predisposed to give desirable responses^[40] and are likely to potential recall bias. Moreover, clinical diagnosis of FD could provide more valid and reliable results than questionnaire-based diagnosis. Second, we did not differentiate between FD patients who actively sought medical attention and those who did not. Although this eliminated the self-selection confounding factor, there are some differences between the two groups that might be considered.^[41,42]

CONCLUSION

Our findings added to the growing literature that a vast majority (about two-thirds) of patients with FD, suffered from anxiety, depression or psychological distress. Although, the prevalence of FD is less in males than females, but psychological links were

stronger in males. Thus, it is essential to consider and detect the psychological distress in these patients and treat them to achieve the optimal medical outcome and compliance.

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Conflicts of interest

There are no conflicts of interest.

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