Functional Dyspepsia (FD); Prevalence and Relationship with Psychological Disorders among Medical Sciences Students

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ABSTRACT

The educational environment of medical sciences creates multiple stressful situations; also, psychological disorders are one of the causes for FD. Therefore, this study conducted to investigate the prevalence and relationship of FD with psychological disorders among medical sciences students. This cross-sectional study was conducted on 630 medical sciences students in 2015. Selected participants were evaluated for FD by a general practitioner according to ROME III criteria, and psychological disorders of students were evaluated by a clinical psychologist by using the General Health Questionnaire (GHQ-28). Out of all participants, 120 (20%) participants suffered from FD. There was no significant difference between the two different groups on variables such as age (p=0.546), sex (p=0.751), marital status (p=0.878), residence (p=0.113), GPA (p=0.080), and years of education (p=0.463) as far as FD was concerned. But, there was a significant difference between the different fields on frequency of FD (p=0.012). Participants with FD had significantly higher frequencies of general mental disorder (p=0.017), somatic symptoms (p=0.017), anxiety (p=0.000), social dysfunction (p=0.003) and depression (p=0.007). The prevalence of FD among students was above the average prevalence in the general population; these results might be due to the youngness of our study population and high frequency of psychological stress in medical training environments. Also, frequency of psychological disorders in FD patients was notably higher than healthy individuals.

Keywords: Functional Dyspepsia, Psychological Disorders, Medical Students

INTRODUCTION

Dyspepsia is defined as episodic discomfort in the epigaster caused by the upper digestive system [1]. Almost, a quarter of dyspepsia cases occur following organic disorders such as peptic ulcers, gastric malignancies, gastroesophageal reflux disease, NSAID consumption and biliary colics. On the other hand, diagnostic evaluations find no underlying causes in about 75 percent of cases [2-5]. Studies have reported a prevalence of 11-29.2 percent for FD. The difference of dyspepsia prevalence is mostly related to different diagnostic criteria and populations [6, 7].

Stress and mental disorders such as anxiety, depression are frequently reported among patients with functional disorders of the gastrointestinal system [7-12], and psychological disorders may worsen dyspepsia symptoms and have negative effects on treatment [7, 13]. The educational environment of medical sciences creates multiple stressful situations and poses harmful effects on academic performance, physical and mental health, As Liselotte et al conducted a study on 2246 medical students and...
reported that 82 percent of the students had at least one mental distress [14-16]. Therefore, it can be assumed that the environment can increase FD.

Due to our knowledge, a few studies have been conducted to investigate FD and their association with psychological disorders among medical sciences students [11, 12, 17-21]. Due to the importance of the disease and its relationship with the physical and mental health, this study was designed to investigate the prevalence of FD and their association with the psychological disorders in Hormozgan University of Medical Sciences.

MATERIALS AND METHODS

This was a cross-sectional study with stratified random sampling. According to the previous studies, prevalence of dyspepsia and psychological disorders were 20 percent and 28 percent respectively [7, 22-24], and they were used to calculate the sample size by means of Cochran’s sample size formula. Confidence interval and test power of 95% were taken into consideration and the sample size was calculated as 630 people. As regards, the sample size of 630 people comprised approximately 30 percent of the total number of students. Regarding the stratified sampling method used in the study, 30 percent of each class of university students randomly entered the study. Thus, medical students from the 1st year to the 7th year were divided into 7 classes and paramedical students (all majors) from the 1st year to the 4th year were divided into 4 classes. Inclusion criteria were having completed at least one semester in the university and giving consent to participate in the study. Exclusion criterion was lack of cooperation during the study period (not filling the questionnaire completely or lack of cooperation in the study process). Finally, all the eligible participants were visited by a general physician in order to assess FD using ROME III criteria. In addition, a clinical psychologist (without knowledge of the result of the interview with the general physician) evaluated the students regarding psychological disorders by means of GHQ (General Health Questionnaire); a 28-item questionnaire. Then, those with FD according to ROME III criteria and those without FD were evaluated and compared regarding general mental disorder and sub-scales of depression, anxiety, social dysfunction and somatic symptoms.

A checklist was distributed to all participants to collect demographic data such as age, gender, GPA, field of study, year of education and residence.

ROME III criteria defines FD as the presence of Postprandial distress syndrome (postprandial early satiation and fullness) with or Epigastric pain syndrome (unexplained epigastric pain of burning which would not resolve after defecation), for three months in the past six months without any of the following characteristics: consuming nonsteroid anti-inflammatory drugs (NSAIDs) or antibiotics two weeks prior to study, peptic ulcer symptoms (burning pain in the epigaster which increases during the night and wakes up the patients), gastroesophageal reflux disease symptoms (heartburn, acid regurgitation), gastrointestinal malignancy symptoms (unexplained significant weight loss, loss of appetite, frequent vomiting, dysphagia, odynophagia, family history of gastrointestinal malignancies or lower gastrointestinal bleeding) [11, 17-19, 21, 25-29].

28-item General Health Questionnaire (GHQ-28): GHQ-28 was used to evaluate mental health. GHQ-28 has been divided into four subscales. These are: somatic symptoms (items 1-7); anxiety (items 8-14); social dysfunction (items 15-21), and depression (items 22-28). In this study Goldberg’s conventional scoring was used which is in the form of 1-1-0-0. This means choices A and B get a score of 0 and choices C and D get a score of 1. Therefore, if each of the 28 symptoms were more than usual the score of 1 is allocated to each and the maximum score will be 28. If the sum of the scores one gets is six or more, that person lacks mental health. In addition, a score of two or more in the field of depression, anxiety, social dysfunction and somatic symptoms means a disorder in that field. According to previous studies, this questionnaire enjoys reliability and validity [30-34]. The sensitivity and specificity of the Persian translation of GHQ-28 has also reported to be 84.7% and 93.8%, respectively. The Persian translation also has a high reliability and Cronbach's alpha of 0.85 [31, 35, 36]. Data were analyzed using SPSS v. 20 software using descriptive statistics such as mean, standard deviation (SD), frequency and percent, t-test for quantitative variables and chi square for qualitative variables.
RESULTS

Six hundred out of 630 distributed questionnaires were completed correctly (response rate was 95.23%). Out of 600 studied students, 220 (36.7%) were males and 380 (63.3%) were females. The participants were between 16-40 years old with the mean age of 21.58±2.1251. Based on the Rome III criteria, 120 participants (20%) were diagnosed with FD with the CI of 95%. Among those with FD, 14 (11.7%) and 113 participants (94.2%) were with Epigastric pain syndrome (EPS) and Postprandial distress syndrome (PDS), respectively.

Relationship between Demographic Variables and FD

The mean ages of those with FD and the ones without it were 21.47±1.82 and 21.60±2.19, respectively (p=0.546). The differences were not statistically significant. FD frequencies in males and females were 19.1% (n=42) and 20.5% (n=78), respectively (p=0.751). The differences were not statistically significant. There was no significant difference between the two different groups on variables such as marital status (p=0.878), residence (p=0.113), GPA (p=0.080), and years of education (p=0.463) as far as FD was concerned. However, Table 1 shows a significant difference between the different fields on frequency of FD.

<table>
<thead>
<tr>
<th>Field</th>
<th>Without FD (%number)</th>
<th>With FD (%number)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical</td>
<td>75.4%-107</td>
<td>24.6%-35</td>
<td>0.012</td>
</tr>
<tr>
<td>Dentistry</td>
<td>36%-75</td>
<td>25%-12</td>
<td></td>
</tr>
<tr>
<td>Paramedical</td>
<td>79.9%-237</td>
<td>20.7%-62</td>
<td></td>
</tr>
<tr>
<td>Health</td>
<td>90.1%-100</td>
<td>9.9%-11</td>
<td></td>
</tr>
</tbody>
</table>

Relationship between Psychological Disorders with FD

Based on the statistical analysis, mean ages of those with FD was 21.47±1.82 and mean age of the control group was 21.52±1.91, which did not have a statistically significant difference (p=0.836). Table 2 shows a significant difference between the control and FD groups on general mental disorder. Moreover, a statistically significant difference was found on GHQ test subscales between the FD and control groups on somatic symptoms, anxiety, social dysfunction, and depression scales. Mean of the FD group exceeded the one of control group.

<table>
<thead>
<tr>
<th></th>
<th>Control (%number)</th>
<th>FD (%number)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>General mental disorder</td>
<td>14.2%-17</td>
<td>27.5%-33</td>
<td>0.017</td>
</tr>
<tr>
<td>Somatic symptoms</td>
<td>18.3%-22</td>
<td>32.5%-39</td>
<td>0.017</td>
</tr>
<tr>
<td>Anxiety</td>
<td>26.7%-32</td>
<td>52.5%-63</td>
<td>0.000</td>
</tr>
<tr>
<td>Social dysfunction</td>
<td>18.3%-22</td>
<td>35.8%-43</td>
<td>0.003</td>
</tr>
<tr>
<td>Depression</td>
<td>16.7%-20</td>
<td>32.5%-39</td>
<td>0.007</td>
</tr>
</tbody>
</table>

DISCUSSION

Based on this study, 120 participants (20%) were with FD with the CI of 95%. It reported FD frequencies in America, European countries, East Asian countries as 15% [37], 23.8-14.7% [38, 39], and 17-24% [40, 41] respectively. Generally, the review study of Mahadeva et al. in 2006 reported it as 29.2-11% throughout the world [6]. The studies in Iran reported FD frequency as 16% [24, 42]; however, most of the studies were conducted using old criteria such as Rome I and Rome II. Since FD are varied considerably in their diagnosis based on the used criteria [6, 43, 44], a correct comparison cannot be made between the results and the ones of present study. For example, a study in Taiwan showed FD based on Rome I and Rome II as 8.23% and 8.11%, respectively [43].

The studies by using the Rome III criteria on a general population, in Taiwan, Iran, and Sweden showed FD frequencies as 5.3%, 12.6-16%, and 15.7%, respectively. In all cases, the rates are lower than the ones of our study [11, 12, 42, 45-47]. A significant relationship was observed between FD and mental disorders [48-50]. Mental stresses were also discussed as the potential causes of FD [50-53]. Therefore, larger frequency of FD among medical sciences students as compared with the general population might be because of high frequency of psychological stress in medical training environments [14, 15]. Also, based on the previous studies, prevalence of dyspepsia is higher in youngsters than it is in other age groups [6, 54, 55]; however, this may be due to a younger study population.

The study of Dong et al. on medical and non-medical students in China using Rome III criteria reported FD frequency as 9.25% [52], which is
consistent with our study. The results of past studies about FD symptoms showed that PDS frequency was more than the one of EPS, which is consistent with our study [11, 12, 45-47, 56, 57]. Previous studies in Iran and in the world, frequently reported the higher prevalence of FD in women than in men [6, 7, 12, 20, 24, 45]. The results of the current study were in concordance with the previous studies; however, contradictory to the study conducted by Dong et al on university students, the statistical difference in our study was not significant which may be due to the characteristics of the population of the current study; because of their direct contact with the healthcare system, they would pay more attention to the disease symptoms and therefore the role of sex will be eliminated from the study. On the other hand, it has been shown that women pay more attention to their health, more frequently seek medical consult and go to healthcare centers and that is why their disease is diagnosed earlier [58-60]. However, our study population did not only include those who were referred to or those attending healthcare centers. According to the study conducted by Li Mang on non-medical students, dyspepsia was significantly more prevalent in women than in men [57].

According to a study on general population in Hong Kong, there was no significant relationship between marital status and dyspepsia [45]. In the current study, considering variables such as place of residence, GPA and marital status, there was no significant difference among different groups regarding functional dyspepsia. In our study, there was not a significant difference among different years of university studies regarding functional dyspepsia which was in concordance with the study by Dong et al on medical and non-medical university students in China [52]. However, in the study conducted by Li Mang on non-medical students, significantly more students in their last year of university studies suffered from this condition [57]. However, there was a significant difference regarding functional dyspepsia among different university majors.

The results of our study demonstrate that the prevalence of mental health disorders and sub-scales of GHQ-28 such as somatic symptoms, anxiety, social dysfunction and depression were significantly higher in people with functional dyspepsia.

A significant relationship was also seen between functional gastrointestinal disorders (FGID) such as functional dyspepsia and mental disorders such as anxiety, depression, and non-GI physical complaints. Anxiety and depression were also discussed as the predictive risk factors of dyspepsia [7, 11, 45, 61]. Heon-jeong Lee et al., and De la Roca-Chiapas et al. studied functional dyspepsia using ROME criteria and Beck to examine individuals and proved a significant relationship between depression and anxiety and functional dyspepsia [53, 62]. The study of Branka F. Filipović on anxiety and depression of individuals using Hamilton Depression and Anxiety Rating Scales showed that the mean score of the depression and anxiety of those with functional dyspepsia was significantly higher than the one of healthy individuals [63].

In contradiction, in the study conducted by Kalixanda which used ROME III criteria to assess people regarding dyspepsia and Hospital Anxiety and Depression Scale (HADS) to evaluate people regarding depression and anxiety, functional dyspepsia was significantly related to anxiety but it had no significant relationship with depression; however, average depression score of people with functional dyspepsia was reported to be higher than healthy individuals [11]. Accordingly, based on the results of most of the studies done using different methods and criteria, we can conclude that there is a relationship between functional dyspepsia and both anxiety and depression.

Several studies reported a strong relationship between functional dyspepsia and social dysfunction, reduced quality of life, non-GI somatic symptoms, and somatoform disorder [9, 64-68]. For example, the study of T. Tangen Han et al. showed that physical complaints of those with functional dyspepsia were significantly higher than the ones of healthy individuals. The complaints consisted of different symptoms such as fatigue, musculoskeletal symptoms, and cardiac and dyspeptic symptoms [9]. In this study, absences of the individuals with functional dyspepsia due to illness were significantly higher than the ones of healthy individuals. Several studies have discussed increased visceral sensitivity as one of possible causes of dyspepsia symptoms. Although the cause of increased sensitivity is still unknown, the studies enumerated increased sensitivity following inflammation and gastrointestinal tract infection,
impaired gastric accommodation, abnormal fundic phasic contractions, stress and stress and associated psychological disorders, and changes in central sensory processing as some possible causes [69]. Remarkable coincidence and overlapping among somatoform disorders such as somatization and fibromyalgia with dyspepsia symptoms [70], emphasize some of above-mentioned causes on increased visceral sensitivity among dyspeptic patients that are not related to the lining of the gastrointestinal tract such as stress, associated psychological disorders and changes in central sensory processing. This assumption is consistent with the results obtained by Vandenberghe et al. They proved that increased visceral sensitivity might have originated in an organ other than GI tract lining (gut) and it might have involved a multimodal pathway [71].

**CONCLUSION**

The prevalence of FD among students was above the average prevalence in general population, this results might be due to the youngness of our study population and high frequency of psychological stress in medical training environments. Also, frequency of psychological disorders in FD patients was notably higher than healthy individuals. Based on the literature, a relief from dyspepsia might improve the general mental health and a more relaxed environment might decrease dyspepsia. Since both conditions might impact health quality services, they can impact the overall health of general population.

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