



Original Article

Relationship of functional dyspepsia with mental and physical stress

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Abstract

Background: Functional Dyspepsia is a globally prevalent illness, which although not life-threatening, displays a strong influence on the quality of life. Functional Dyspepsia is essentially chronic indigestion with no obvious physical cause. The objective of this study was to evaluate the frequency of functional dyspepsia and its association with mental and physical stress. It could have the same significant association as Irritable Bowel Syndrome has with stress.

Methodology: The data were collected from 221 students from 3 medical colleges of Karachi, Pakistan. Subjects were asked to fill out questionnaires concerning demographics, lifestyle, and dietary habits. Rome III criteria was employed to identify functional dyspepsia and sub-sections of the Sadaf Stress Scale (SSS) was used to measure mental and physical stress.

Results: Out of the 221 subjects majority were females (67.4%) with a mean age of 21.47 years. 34.8% of subjects were diagnosed to have functional dyspepsia, out of which around three quarters were females (68.5%). A moderate positive correlation was observed between functional dyspepsia and mental and physical stress.

Conclusion: It is concluded from the study results that there is a high frequency of functional dyspepsia among individuals with mental and physical stress or functional dyspepsia might cause the stress.

Keywords

Functional Dyspepsia, Physical Stress, Mental Stress, Sadaf Stress Scale (SSS), Rome III Criteria.



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Introduction

Functional Dyspepsia is a common gastrointestinal disorder characterized by chronic indigestion with no obvious physical cause¹. It is usually referred to as a diagnosis of exclusion, which is made when all required investigations reveal no identifiable etiology¹. The condition is multifactorial and therefore the etiological factors are diverse. Globally, the prevalence lies in between 11.3% age \geq 60 years compared to 9.9% with patients aged below 60, whereas in Asian regions the reported frequency is in between 8% to 23%^{2,3}. The prevalence among medical students is unknown. Pathophysiological abnormalities accompanying the condition include accelerated gastric emptying, impaired gastric accommodation, gastric or duodenal hypersensitivity to distension, and nutrients⁴.

Literature confirms that stress affects the gut-brain communication, and induces pain, bloating and other gastrointestinal problems^{4,5}. Stress either be physical or mental greatly influences the gut bacteria which in turn alters the mood, emotion and behaviour. Therefore, there is a direct impact of brain and gut activity over one another⁵. A study indicated that personality patterns including depression, anxiety and stress altered the individual's gastrointestinal tract activity⁶. Significant exposure to stress increases the risk of gastrointestinal tract diseases⁷. It is proposed that the mood alterations are associated with Irritable Bowel Syndrome (IBS) and functional dyspepsia⁶. Moreover, the young population is more likely to develop such gastric conditions as the current educational model imposes inadvertently opposing effects on the mental health of the learners and due to high frequency of depression and anxiety, they have increased susceptibility for disorders such as functional dyspepsia⁸.

Although it is believed that a little stress makes a positive impact and always makes the immune system stronger. Individuals with moderate physical stress usually have

improved cardiac health and their immune system performs better against infections. In addition, the progress after surgical procedures is also faster among individuals undergoing modest levels of stress⁹. It is said that physical stress is necessary for survival but within the optimal range. As chronic physical stress weakens the immune system and causes hypertension, anxiety, depression, fatigue, gastrointestinal, and cardiac difficulties⁹. Mental stress affects parts of the brain involved in memories, perception, thoughts and decision-making processes. Moderate stressful events enable the brain to perform better. But continuous academic stress and/or work stress involving increased cognitive functioning leads to psycho-somatic abnormalities which in turn affects the gastrointestinal system and function⁹.

The Rome III criteria is frequently employed to establish the diagnosis of functional dyspepsia and other gastrointestinal disorders which includes postprandial fullness, early satiety, pain and burning sensation in epigastrium providing negative status on the required investigation including an upper GI endoscopy, with the onset of at least six months and the duration of at least three months¹⁰. A stress evaluation concept and specific stress evaluating tool for the local Pakistani population, Sadaf Stress Scale (SSS) has been developed and widely used for the evaluation of seven different types of stresses specifically among the Pakistani people¹¹. The scale is divided into seven subcategories comprising of 114 items entitled physical, mental, psychosocial, traumatic, nutritional, emotional, and chemical stress. Preliminary data collected showed high variability and predictability. Cronbach reality test obtained a value between 0.945 and 0.916. Revises SSS use 95 items, employing Spearman brown coefficient analysis with significant coefficient levels⁹.

Although dyspepsia is not a life-threatening entity, it certainly has dreadful effects on the patient's quality of life¹². It is one of the



diseases having a significant medical, economic, social, and political impact on the society. In Pakistan, information about epidemiology and risk factors for functional dyspepsia and related disorders specifically among university or medical students is scarce. The objective of the present study was to determine the frequency of functional dyspepsia and its association with mental and physical stress among medical students of Pakistan.

Methodology

A survey based study was conducted at 3 medical colleges (Karachi medical & dental college, Sindh Medical College, and Dow Medical College) of Karachi, Pakistan. We approached a total number of 240 medical students out of which 221 volunteered to participate in the study. Prior Informed consent was obtained from all subjects. Study participants were asked to fill a structured questionnaire comprising of demographics, lifestyle, and food intake information. Rome III criteria were used to identify functional dyspepsia¹⁰ and to measure the physical and mental stress, sub-section of Sadaf stress scale (SSS) was used¹¹, this Likert scale consists of 5-point scale ranging 1 to 5 i.e., Never, Rarely, Sometimes, very often, always and the

response scores were calculated and categorized into the level of stress i.e., Normal, Mild, Moderate, and Severe.

Data analysis was performed using the SPSS version 22.0. The frequency was calculated for functional dyspepsia. Correlation with stress variables and gender differences were determined using Spearman's rho and Mann Whitney U test, respectively. We also calculated the Mean rank for functional dyspepsia and physical and mental stress with the Kruskal Wallis H test. The p-values ≤ 0.05 was considered statistically significant.

Result

The data from 221 medical students was analyzed, of them, the majority were females (67.4%). The mean age of the sample population was 21.47 years. A total of 34.8% of subjects were diagnosed to have functional dyspepsia, out of which around three quarters were females (68.5%). A strong positive correlation was observed among functional dyspepsia and both mental ($r=0.411$; $p=0.001$) and physical stress ($r=0.475$; $p=0.001$) (Table 3). The difference in symptoms of dyspepsia was statistically insignificant between both genders (p -value=0.69).

Table 1: Demonstrates the gender-based differences in the relative frequency of functional dyspepsia in the study population

Variable	Gender n(%)		p-value
	Male (n=72)	Female (n=149)	
Frequency of dyspepsia	25(32.4)	52(68.5)	0.69

**p-value<0.05 is considered significant*

As per the results obtained from Rome III Criteria, functional dyspepsia was more frequent among the 3rd year (32.4%) and 5th year (22%) medical students. Concerning physical and mental stress, the results were comparable in all years but it was observed that the 1st year students had relatively maximum physical and mental stress.

Table 2: Demonstrates the yearly distribution of the sample population with reference to the frequency of dyspepsia and stress (mental & physical)



Years	Total n(%)	Rome III Criteria (n)				Dyspepsia n(%)	SSS (Mean Ranks)	
		Heartburn	Epigastric Pain	Abdominal Fullness	Early Satiety		Mental Stress	Physical Stress
1 st	31(14)	12	13	13	13	13(16.9)	136	140
2 nd	26(11.8)	11	11	11	11	11(14.3)	111.5	130.8
3 rd	75(33.9)	25	24	25	25	25(32.4)	106.6	98.8
4 th	31(14)	11	11	12	11	11(14.3)	118.5	125.1
5 th	58(26.2)	17	17	17	17	17(22)	97.6	93.3

Table 3 shows the correlation of physical and mental stress with functional dyspepsia, it was found to be significantly correlating with mental and physical stress among the studied population (p -value=0.001).

Table 3: Correlation of functional dyspepsia with mental and physical stress.

Variables	Co-relation coefficient	p-value
Dyspepsia	Mental Stress	0.411
	Physical Stress	0.475

* p -value < 0.05 is considered significant

Discussion

Stress was determined as a positive risk factor for the development of functional dyspepsia among the local medical students, which is also supported by several previous studies¹³⁻¹⁶. The regular diagnostic rate of functional dyspepsia among the Pakistani population ranges between 11 to 15%, as reported by local physicians¹⁷. In our study population, the frequency of functional dyspepsia was found to be 34.8%. In comparison, an Indian study reported a lesser frequency than our estimated figure despite having similar demographics and lifestyle factors². This inflated rate might be due to higher (moderate and severe) physical and mental stress in our study population.

In support several studies confirmed the bi-directionality of the brain-gut pathway i.e. stress has detrimental effects on the quality of life of an individual, influencing mood, emotions and gut activity and hence leads to functional gastrointestinal disorders^{18,19}. A higher frequency of functional dyspepsia is observed among individuals enduring high occupational stress, intense physical activity

and those involved in cognitive activities, specifically students^{20,21}.

Other than stress, several other lifestyle factors including tobacco smoking, alcohol consumption and junk food consumption, etc. increase the likelihood of development of functional dyspepsia^{2,22,23}. Although alcohol consumption is yet not common locally but smoking and junk food consumption remain at the forefront of doing the damage to the normal gut activity in addition to stress. Increased consumption of junk and fried food was found among the enrolled study participants with a high frequency of functional dyspepsia.

People suffering from functional dyspepsia exhibit a greater rate of absence from work, reduction in productivity, and higher dependence on healthcare resources compared to general population²⁴. For students, the symptoms associated with functional dyspepsia may cause a significant impact on the study habits, concentration span, class attendance, and test performance.



To the best of our knowledge, none of the Pakistani universities currently have a students' health counselling program particularly related to the students' mental and psychological health. Campus-wide health seminars/workshops discussing and highlighting symptoms as well as management of stress-induced psychological and physical impairment, e.g. functional gastrointestinal disorders, can lead to a reduction in the overall prevalence of these disorders. Besides, one of the major limitations of the study was the unavailability of the Stool Antigen test for *Helicobacter Pylori* infection and upper GI Endoscopy, which should have been done as a screening protocol.

Conclusion

In conclusion, our findings indicated an alarming frequency of functional dyspepsia among medical students and its strong correlation with mental and physical stress. In order to devise better management of functional dyspepsia and to minimize the chronic depletion of resources, further large-scale extensive studies investigating the gut-brain communication among the subjects with functional dyspepsia must be carried out involving the local population.

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