



Original Article

Unraveling the Mind-Gut Connection: Investigating Anxiety and Depression in Functional Dyspepsia

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ABSTRACT

Psychological association with functional dyspepsia underscores the importance of a holistic approach to its management, addressing both physical and psychological aspects of the condition. **Objective:** To determine the relationship of anxiety and depression with severity of dyspepsia. **Methods:** A prospective cross sectional study was carried out in the Endoscopy Unit, Department of Gastroenterology, Baqai Medical Institute. All patients fulfilling the Rome III criteria for functional dyspepsia with normal endoscopy findings were included in the study, Pregnant females, patients with known diabetes, chronic kidney disease, chronic liver disease and known psychiatric illness, history of peptic ulcer disease and use of NSAIDs, steroids or alternative medicine were excluded. Severity of dyspepsia was assessed by Short Form Leeds Dyspepsia Questionnaire (SF-LDQ). Whereas hospital anxiety and depression scale (HADS) was used to assess the psychological factors. **Results:** A total of 223 participants were included in the study. Out of 223 participants, majority 55.6% (124) had moderate dyspepsia, followed by severe dyspepsia 26.9% (60), mild dyspepsia 12.6% (28) and very mild dyspepsia 4.9% (11). Using Hospital Anxiety And Depression Scale (HAD-S), we found that out of 223 participants, 56.5% (126) had moderate to severe anxiety and depression while 29.1% (65) had mild anxiety and depression. **Conclusions:** It was concluded that functional dyspepsia is clearly associated with common psychological disorders like depression and anxiety. Early recognition and timely linkage to care in such cases can considerably improve the health-related quality of life and hence decrease the global burden of this common disorder.

INTRODUCTION

Functional dyspepsia (FD) is the most common gastrointestinal disorder prevalent in people coming to the outpatient department [1]. FD is defined as the presence of one or more dyspeptic symptoms that originate from the gastroduodenal region without any organic, metabolic or systemic disease likely to explain the symptom complex [2]. It has different subtypes with different aetiopathological factors. Two common varieties along with the third variety with overlapping features from both subtypes are identified. Amongst them is the postprandial distress syndrome (PDS) and epigastric pain syndrome (EPS) with a third type carrying features from both.

Functional dyspepsia is considered as a multifactorial disorder. Various factors are involved in its pathophysiology ranging from abnormal gastric motility to increased visceral hypersensitivity while several other factors like life style, *Helicobacter pylori* infection, dietary habits and psychological factors pitch in to make a person more vulnerable to these physiological abnormalities. It is also known that patients with functional dyspepsia have an abnormal response to stress and a gut brain disorder play a vital role in these individuals. Anxiety, depression and somatoform disorders are identified as the most prevalent form of psychological disorders among the patient with

functional dyspepsia. Psychological factors affect the symptom threshold and dyspepsia is the physiological manifestation of psychological distress [3, 4]. Functional dyspepsia is diagnosed via Rome III criteria which consist of a single symptom or more than one symptom of burning in epigastrium, pain in epigastrium, post prandial fullness or early satiety after meals without any evidence of structural disease that is likely to explain symptoms. These symptoms must be chronic occur at least weekly for at least 6 months. According to the criteria the global prevalence is around 8.4% [5, 6]. Although functional dyspepsia is not a life threatening condition, its bothersome symptoms lead the patients to frequent hospital visits, increased consumption of drugs and more absentees from workplace hence affecting their quality of life [7]. Psychological disorders are often overlooked, resulting in sub-optimal psychiatric and medical management [8]. Scientific work has been conducted worldwide to assess the psychological factors associated with functional dyspepsia, however there is very little literature from Pakistan. In Peshawar a hospital based study revealed that the functional dyspepsia was recorded in 89.9% of patients [9]. According to a study majority of patients with functional dyspepsia had underlying psychiatric disorders [10]. Every country has its own demographics and different cultural aspects affect the citizens differently.

The aim of this study was to assess the psychological factors affecting the patients of functional dyspepsia and their effect in a person's day to day life.

METHODS

A prospective cross sectional study carried out in the Endoscopy Unit of Gastroenterology Department of Fatima Hospital at Baqai Medical University, Gadap Town Sindh from December 2021 to April 2024 after the approval of ethics review board of Baqai Medical University on 17th Nov 2021, Ref: BMU-EC/05-2021. All patients coming to the endoscopy suit of gastroenterology department with dyspeptic symptoms who fulfilled the Rome III criteria for functional dyspepsia with no gross abnormality on esophagogastroduodenoscopy (EGD) were included in the study. Pregnant females, patients with known diabetes, chronic kidney disease, chronic liver disease and known psychiatric illness, history of peptic ulcer disease and use of NSAIDs, steroids or alternative medicine were excluded. All patients with a history of abdominal surgery, with the exception of appendectomy, cholecystectomy, or hysterectomy more than 1 year previously were also excluded from the study. Demographic data comprising of age, gender, ethnicity, marital status, education, occupation, employment status, and any addiction were collected after written informed consent. Severity of

dyspepsia was assessed by Short Form Leeds Dyspepsia Questionnaire (SF-LDQ). The SF LDQ has four questions along with one question asking about the most troublesome symptom. Each question has two stems regarding the severity and frequency of dyspepsia during the past two months. SF-LDQ is interpreted as score of 0 'no dyspepsia', score of 1-4 as 'very mild dyspepsia', score of 5-8 as 'mild dyspepsia', score of 9-15 as 'moderate dyspepsia' and score of >15 indicates 'very severe dyspepsia' (Annexure-I)[11]. Patients were assessed for psychological disorders, using the Hospital anxiety and depression scale (HAD) [12]. HADS measures symptoms of anxiety and depression on separate subscales each having seven items. Scoring for each item is on Likert scale ranging from 0-3. The maximum attainable score was 21 for each. A subscale was used to depict them as Normal (0-7), Borderline abnormal (8-10) and as a Case (11-21) for each anxiety and depression separately, with the highest score denoting high level of depression and anxiety (Annexure-II). Using online open epi calculator keeping the prevalence 75.3% with 95% confidence interval and 6% precision, the required sample size was calculated to be 199 participants [13, 14]. All the participants were included using non probability convenient sampling. Data entry and analysis was performed using SPSS version 21.0. Categorical variables were described using frequency and percentages whereas continuous variables were summarized using mean \pm standard deviation. Chi-square was used to assess bivariate association between the study variables. The significance level was kept at 0.05.

RESULTS

A total of 223 participants were included in the study with a response rate of 98 %. The mean age of study participants was 35.2 \pm 9.5 years, 123 (55.2%) of them were females, 155 (69.5%) were married, 89 (39.9%) belonged to Pushtoon ethnicity, 125 (56.1%) had history of addiction, 116 (52%) were literate and 140 (62.8%) were unemployed (Table 1).

Table 1: Demographic Characteristics

Demographic Characteristics (n=223)	Frequency (%)
Age	
Mean \pm SD	35.2 \pm 9.5
Up to 35 Years	129 (57.8)
35 Years or Above	94 (42.2)
Gender	
Male	100 (44.8)
Female	123 (55.2)
Marital Status	
Married	155 (69.5)
Unmarried	68 (30.5)
Employment Status	
Employed	83 (37.2)
Un employed	140 (62.8)

Education	
Literate	116 (52)
Illiterate	107 (48)
Addiction	
Yes	125 (56.1)
No	98 (43.9)
Ethnicity	
Pushtoon	89 (39.9)
Sindhi	68 (30.5)
Others	66 (29.6)

In this study, we categorized participants with dyspepsia on the basis of SF-LDQ score. Out of 223 participants, majority 55.6% (124) had moderate dyspepsia, followed by severe dyspepsia 26.9% (60), mild dyspepsia 12.6% (28) and very mild dyspepsia 4.9% (11)(figure 1).

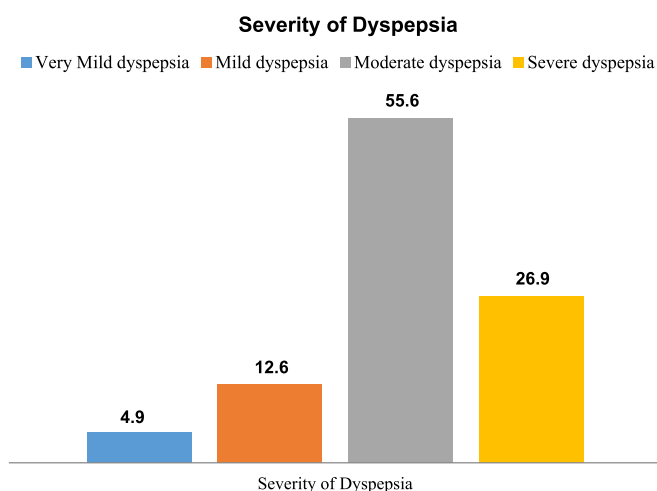


Figure 1: Severity of Dyspepsia

In this study, using HAD-S, we found that out of 223 participants, 56.5% (126) had moderate to severe anxiety and depression while 29.1% (65) had mild anxiety and depression (figure 2).

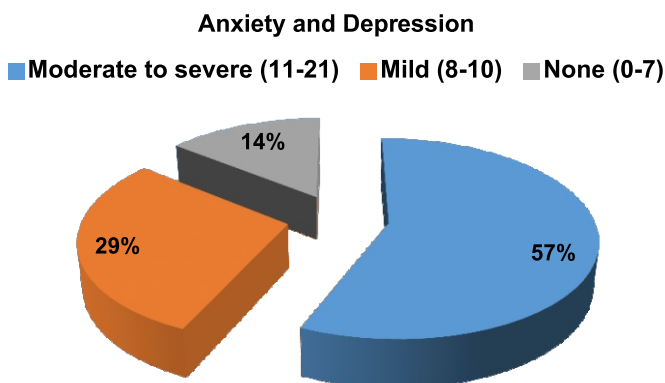


Figure 2: Anxiety and Depression

The study results further revealed that among participant characteristics, only dyspepsia was significantly associated with the presence of anxiety and depression (p=0.001) where (table 2).

Table 2: Association between Participant Characteristics and Presence of Anxiety and Depression

Participant Characteristics (n=223)		Anxiety and Depression				p-Value
		Count (%)				
		Total	None	Mild	Moderate to Severe	
Age	Up to 35 Years	129 (57.8)	22 (9.9)	36 (16.1)	71 (31.8)	0.399
	36 Years or Above	94 (42.2)	10 (4.5)	29 (13)	55 (24.7)	
Gender	Male	100 (44.8)	16 (7.2)	31 (13.9)	53 (23.8)	0.622
	Female	123 (55.2)	16 (7.2)	34 (15.2)	73 (32.7)	
Marital Status	Married	155 (69.5)	23 (10.3)	45 (20.2)	87 (39)	0.951
	Unmarried	68 (30.5)	9 (4)	20 (9)	39 (17.5)	
Education	Literate	116 (52)	14 (6.3)	32 (14.3)	61 (27.4)	0.870
	Illiterate	107 (48)	18 (8.1)	33 (14.8)	65 (29.1)	
Employment Status	Employed	83 (37.2)	13 (5.8)	28 (12.6)	42 (18.8)	0.381
	Unemployed	140 (62.8)	19 (8.5)	37 (16.6)	84 (37.7)	
Addiction	Yes	125 (56.1)	17 (7.6)	43 (19.3)	65 (29.1)	0.148
	No	98 (43.9)	15 (6.7)	22 (9.9)	61 (27.4)	
Ethnicity	Pushtoon	89 (39.9)	15 (6.7)	23 (10.3)	51 (22.9)	0.740
	Sindhi	68 (30.5)	7 (3.1)	21 (9.4)	40 (17.9)	
	Others	66 (29.6)	10 (4.5)	21 (9.4)	35 (15.7)	
Dyspepsia	Very Mild	11 (4.9)	3 (1.3)	6 (2.7)	2 (0.9)	0.001
	Mild	28 (12.6)	7 (3.1)	10 (4.5)	11 (4.9)	
	Moderate	124 (55.6)	20 (9)	37 (16.6)	67 (30)	
	Severe	60 (26.9)	2 (0.9)	12 (5.4)	46 (20.6)	

DISCUSSION

Functional dyspepsia (FD) is a commonly prevailing clinical condition, frequently requiring clinic visits [2]. Common symptoms of FD include epigastric pain and/ or burning, and early satiety. It has a fluctuating course, with patients being asymptomatic followed by periods of symptoms relapse. Being a non-fatal disorder, FD is not associated with increased mortality [2, 3]. However, as with most chronic illnesses, FD has a significant impact on the health related quality of life (HRQOL) of most individuals suffering from this condition, as shown in a meta-analysis [13]. Pathophysiology of FD is multi-factorial. Dysfunction of the intestinal barrier, gut motility alterations, visceral hypersensitivity and dysbiosis of gut microbiomes can lead to FD [16]. However, currently available evidence strongly suggests that alterations of the gut-brain axis a major contributory factor in the development of FD and other forms of functional gastrointestinal disorders (FGID) [17]. The psychosocial impact of FD is considerable. Robust data from Asian countries showed that patients suffering from FD were more likely to display physical, social and emotional dysfunction as opposed to their healthy counterparts [18]. We showed that majority of patients suffering from FD belonged to younger age group, which was < 35 years in our study (57.8%). Other studies done regionally also reported similar results [19, 20]. However, when we analyze international data, we notice relatively higher age group of patients presenting with FD [21, 22]. A

significant number of patients included in our study were not literate and were unemployed (48% and 62.8% respectively), reflecting the fact that our younger population suffers more from socio-economic challenges like unemployment, illiteracy etc. Majority of the patients in our study were females (55.2%), supporting the concept that women with FGID are more likely to have concomitant anxiety and depressive symptoms [23]. Another observation in our study was the dominance of those patients who had some form of addictions (56.1%), again strengthening the notion that population with addiction frequently suffer from underlying psychiatric disorder. Since the population of Gadap Town (where our study was conducted) is multi-ethnic, our sample size included patients of various ethnicities and backgrounds. However, the predominant ethnic group in our study was Pushtoon (39.9%) followed by Sindhi (30.5%). According to the SF-LDQ questionnaire, majority of patients in our study were having FD of moderate intensity. This was in contrast to a recent study from Saudi Arabia, which reported mild dyspepsia as the most common type according to the SF-LDQ questionnaire [11]. This variation can be explained by the difference in dietary patterns and other socio-economic factors between the Saudi and Pakistani population. Additionally, the level of literacy was also higher in patients in the Saudi Arabian study as compared to our recruited individuals, another aspect that seems to be a potentially protective feature against FD [24]. The Hospital Anxiety and Depression Scale (HAD-S) is a simple, reliable and easy to perform tool to measure the level of anxiety and depression, helping physicians to classify those patients who need specialized psychiatric care. This scale has not only been used successfully in Pakistani population, but has also been validated in regional languages of Pakistan [25, 26]. The association between FD and psychosocial dynamics has been studied in the past. Symptoms of FD are thought to be a cause of psychiatric illnesses as low-grade inflammation of the gut can elicit a cytokine response, which is believed to play an imperative part in kicking off psychological stress in patients with FD [27]. However, this association is far more complex. Many studies showed that where females are more likely to suffer from FD [28, 29]. Men suffered more from psychological distress [30]. In the present study, we found that a significantly high number of patients with FD had abnormal HAD-S (56.5%), which indicated moderate to severe anxiety and depression. This association was statistically significant when we compared mild, moderate and severe dyspepsia with the presence of any severity of anxiety and depression. Another study from Pakistan reported moderate to severe depression to be prevalent (49.5%) among a study population of 400 dyspeptic individuals, using the same scale [31, 32]. A similar study from Iran reported even higher prevalence (65%) of these psychosocial disorders

among patients with FD. Comparable results were shown in a placebo-controlled trial of 107 patients suffering from FD [30]. Our study was a single center study and this was our major limitation. However, in our opinion, the multi-ethnic population of Gadap town and the prospective nature of this study makes our data generalizable and robust. Further prospective studies with bigger sample size are needed to consolidate the findings of this study, especially in an underprivileged population of a third world country like ours, which can help identify the gaps in the management of FGIDs.

CONCLUSIONS

Functional dyspepsia is clearly associated with common psychological disorders like depression and anxiety. Our data also revealed that majority of the study participants (56.5%) suffered from moderate to severe anxiety and depression, with dyspepsia being significantly associated with the presence of some form of anxiety and depression ($p=0.001$). Therefore, early recognition and timely linkage to care in such cases can considerably improve the health-related quality of life and hence decrease the global burden of this common disorder.

Authors Contribution

Conceptualization: AS, JA
 Methodology: BR, AA, SMZHN, JM
 Formal analysis: AS, BR, AA, MK, SMZHN,
 Writing-review and editing: AS

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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