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ABSTRACT

AIM: The psychiatric and psychosocial aetiology of Functional dyspepsia is not well known. In the present study, our aim is to determine the relative contributions of psychiatric predictors – i.e. depression, anxiety, somatization, alexithymia – in relation with socio-psychological factors, specifically their personal characteristics (i.e. emotional attachment) and perceived social support, in distinguishing FD from organic dyspepsia and healthy samples.

MATERIAL AND METHODS: An estimated 30 functional dyspepsia, 29 organic dyspepsia patients who were admitted to our gastroenterology outpatient clinic and 27 healthy controls were enrolled to our study. Beck Depression Inventory, Toronto Alexithymia Scale, Adult Attachment Scale, State-Trait Anxiety Inventory, Multidimensional Scale of Perceived Social Support and somatization sub-scale of Symptom Checklist-90 were provided to all patients and healthy controls. All participants were examined by a gastroenterologist and a psychiatrist.

RESULTS: Healthy controls were younger than organic dyspepsia group and women/men rate was lower in organic dyspepsia than other two groups. Depression score was higher in functional dyspepsia group than in healthy controls and functional dyspepsia group's attachment syle was more secure than that of the healthy control group. Somatization rate was seen higher in functional dyspepsia group with psychiatric examination. There was no significant difference seen in anxiety, alexithymia and social support between the three groups.

DISCUSSION: Anxious-avoidant attachment profile as well as the higher propensity to have depressive and anxiety symptoms might be critical psychiatric and psychosocial factors underlying FD's aetiology. A multidisciplinary approach is needed in the follow up of functional dyspepsia patients. Psychological evaluation and treatment would increase the life quality of dyspepsia patients.

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Alexithymia; anxiety; attachment; depression; functional dyspepsia; social support; somatization

Introduction

Dyspepsia is a symptom that involved pain and/or discomfort in epigastric area and it is actively seen in 20–40% of people all over the world [1]. Hospital admissions with dyspeptic symptoms cause a serious workforce and economic loss. There can be no organic reason in 70–80% of patients with chronic dyspeptic symptoms and this condition is called as functional dyspepsia (FD) [2–4]. The psychiatric aetiology might distinguish FD from organic dyspepsia (OD), given that several psychiatric conditions (such as depression, anxiety and the problems of processing emotions) co-exist with FD. Nevertheless, the psychological-social aetiology of FD is not well known. In the present study, tour aim is to determine the relative contributions of psychiatric predictors – i.e. depression, anxiety, somatization, alexithymia – in relation with socio-psychological factors, specifically their personal characteristics (i.e. emotional attachment) and perceived social support, in distinguishing FD from organic dyspepsia and healthy samples.

Attachment refers to emotional bonding pattern of an individual in interpersonal relationships. The attachment theory suggests that one's close interpersonal relationship patterns originate from emotional bonding with individual's mother or primary caregiver and determines his/her psychosocial well-being during adulthood [5,6]. Recurrent experiences with primary caregiver lead children to develop cognitive models about the self and others that form the relationship style throughout their life (internal working models of attachment). Different combinations of

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a sense of self and other yield different attachment types such as: "secure", "insecure-ambivalent" and "insecure-avoidant attachment" [7,8]. In secure attachment, the caregiver ensures a reliable and responsive approach to the infant and this provides the infant a ground to develop an inner sense of safety, trust toward others and an effective regulation of emotions during adulthood. However, insecure attachment style develops when the caregiver is perceived as unavailable, inconsistently responsive and abusing. This leads to dysregulation of stress and results with two diverse tendencies in relationships. One is hyperactivation of the bonding system (insecure-ambivalence), which is characterized by excessive anxiety and fear of loss in relationships. Another one is deactivation of the attachment system (insecure-avoidance) in which the individual denies attachment needs and avoids closeness with others [9–12]. Internal working models of the attachment allow the co-existence of both secure attachment and insecure attachment systems within individuals. A higher insecure attachment tendency is argued as a risk factor for psychopathology, such as depression, anxiety disorders and health problems [13,14]. It is associated with the lack of coping with health-related stress [9], catastrophizing the pain ([15,16], increased symptom reporting [17] and medically unexplained somatic symptoms [18,19]. Moreover, insecure attachment style has an impact on the tendency to lower the likelihood of seeking support in threat conditions, such as pain [20], creating higher propensity to experience adverse effects of health problems as well as resulting psychiatric problems. There is also evidence that significant stresses [21] such as chronic illness might influence the attachment patterns of individuals and might trigger insecure attachment tendencies of individuals [9].

To the extent of our knowledge, the relative contribution of attachment patterns in relation with psychopathology on FD has not been studied before. The present study questions whether FD patients have different attachment profiles than patients with organic dyspepsia or healthy individuals, accounting for several psychiatric and psychosocial factors. Insecure attachment tendencies, due to excessive anxiety and avoidance in the face of dyspeptic symptoms, might be a risk factor for the functional dyspeptic condition. We suggest that secure/insecure attachment would be lower/higher in FD patients compared to organic form or healthy individuals.

In addition to attachment tendencies, the lack of perceived social support can be linked with FD. Perceived social support is defined as individuals' beliefs about the availability of help provided by their social environment such as friends, family, significant others and it has been implicated as a buffer of stressful life conditions such as health problems [22,23]. The buffering impact of the social support is diverse – such as preventing the individual from negatively reacting to a stressor by redefining it as not stressful, increasing an individual's ability to cope with the stressor, providing solutions for stress and having an anxiolytic effect on the brain [23,24]. Research on social support has revealed that individuals with higher level of social support tend to be better at coping with stress than those who lack social support [25,24]. In the case of FD, studies reported lower overall social support received by FD patients compared to healthy controls [26] and the patients reported especially lower perceived social support from family members rather than friends or significant others [27]. In the current study, we claim that FD patients would have lower perceptions of perceived social support compared to healthy individuals.

In addition to emotional attachment and perceived social resource of FD patients, these patients' depression and anxiety profiles might also discriminate them from dyspepsia with organic etiology. Depression and anxiety are the most common psychiatric disorders in general population [28]. Some past studies found higher prevalence of depression in FD patients when compared with healthy population [29,30,27,31–37,26,38–45], though some reported no significant relationship between FD and depression [30,35,40,46,43]. Similarly, there are studies showing significantly higher anxiety levels in FD patients [30,32,34,37,47,48,46,44]. Taking all these studies into consideration, we suggest that FD patients can be differentiated from patients with organic dyspepsia and healthy controls in predicting higher depression and higher anxiety levels, especially in the presence of higher insecure attachment profile.

Alexithymia and somatization are other psychiatric conditions linked with FD and they might also discriminate FD from OD. Alexithymia is marked with the difficulty in identifying and describing emotions in words [49]. Alexithymic patients tend to give attention to the non-sentimental details of external events without recognizing its affective components [49]. This condition plays a role in the manifestations of somatic symptoms of FD patients without any organic reason [50–53]. Somatization is defined as medically unexplained physical symptoms caused by psychological distress [54,55]. There is a substantial body of evidence demonstrating the association between functional gastrointestinal diseases and somatization [56–58] as well as the relationship between functional dyspepsia and somatization [59–62]. In the present study, we expect higher degrees of alexithymia and somatization in FD patients compared to patients with organic dyspepsia or healthy controls.

Materials and methods

Patients who applied to gastroenterology outpatient clinic between August 2005 and December 2013 prospectively enrolled in the study. FD was diagnosed according to current Roma II or III criteria based on the admission date. The exclusion criteria were any systematic disease; end-stage organ failure; contraindication for endoscopic evaluation; had any gastrointestinal operation, non-steroid anti-inflammatory drug and aspirin users. The healthy control group was composed of the hospital workers and patients' relatives. The study was approved by the local ethics committee and conducted according to the good clinical practice guidelines. Written informed consent was obtained from all patients and healthy participants before their participation to the study.

Gastrointestinal evaluation

Informed consent was, first, obtained from patients who had dyspeptic symptoms for endoscopic evaluation. Patient was laid on his/her left side. Midazolam was used for controlled sedation. Oxygen saturation, pulse and respiratory rate were monitored during the standardized video-endoscopy procedure. Oesophagus, stomach and duodenum were observed. If any lesion (erosion, ulcer etc.) was detected in macroscopic evaluation, the patient was labelled as organic dyspepsia. Functional dyspepsia was diagnosed according to Rome II and III criteria (with the current criteria at the time of diagnosis) and also upper gastrointestinal endoscopy performed within indication to patients and organic lesions excluded. Anamnesis and physical examination were performed to all patients. The healthy control group was evaluated with only anamnesis and physical examination without endoscopy.

Psychiatric evaluation

Depression, alexithymia, attachment patterns, anxiety, and perceived social support levels were, respectively, assessed with self-report scales namely Beck Depression Inventory (BDI), Toronto Alexithymia Scale (TAS), Adult Attachment Scale (AAS), State and Trait Anxiety Inventory (STAI) and Multidimensional Scale of Perceived Social Support Scale (MSPSS). A psychiatrist took anamnesis of all participants and questioned major life events (i.e. major life stressor during adulthood and childhood, an important loss in childhood, childhood maltreatment/neglect, father/mother illness during development, living away from the family during development. The psychiatrist also examined them for somatization symptoms with somatization sub-scale (questions numbered 1, 4, 12, 27, 40, 42, 48, 49, 52, 53, 56, 58) of Symptom Checklist-90. Participants also reported their socio-demographic data (i.e. age, gender, education, marital status).

Statistical analysis

We utilized multiple analysis of variance (MANOVA) and then discriminant analysis to examine the psychiatric and psychosocial predictors that distinguish the FD and the control groups [63,64]. ANOVA was used for the comparison of age and chi-square analyses were used for categorical socio-demographic variables and clinical symptoms. The p value of .05 was accepted as the significance level.

Results

Our sample consisted of 86 participants (81.4% female, mean age 46.59 ± 11.71 (20–74) years). Thirty (34%) of the participants had FD, 29 (33%) had organic dyspepsia (OD) and 27 (%31) were healthy control (HC). Groups did not significantly differ on socio-demographics (see, Table 1), except that HCs were significantly younger than OD and the female/male ratio was significantly higher in HC compared to OD and FD. Hence, we controlled for age and gender for subsequent multivariate analyses. The most frequent clinical symptom was distension in FD group and epigastric pain in OD group, yet group differences on symptoms did not reach significance level (see, Table 2). Chi-square analyses also revealed no significant difference among groups on the major life events. We also asked a general question of "how much your physical complaints affect your life?" to the participants. Sixteen (53.3%) participants answered with "absolutely affecting" (high effect) in FD group and it was statistically significant when compared with OD ($p < ,05$).

Prior to multivariate testing, we checked for the multivariate normality of each predictor variable and the homogeneity of covariance matrices. These assumptions held and therefore we proceeded to MANOVA. The analysis revealed that groups significantly differed on depression level, but not on state or trait anxiety, attachment styles, somatization, alexithymia or perceived social support. Bonferroni post-hoc test showed that FD group (15.37 ± 9.45) has significantly higher depression level compared to the healthy controls (9.6 ± 6.13). FD group has also higher depression level than the OD group (11.79 ± 5.45), yet the difference did not reach significance level.

To examine which psychiatric and psychosocial variables distinguish FD from OD or HC, we conducted stepwise discriminant analysis following MANOVA [65]. The tests for equality of group means, basing on Wilki's Lambda, indicated that groups significantly differ on depression, trait anxiety, perceived social support from family and anxious-avoidant attachment style (see, Table 3).

Table 1. Demographic and socio-cultural data of the participants.

Study Group	Age (years)	Gender n (%) (Female/Male)	Marital Status n (%) (Married/Single/Widow)	Education n (%) (Primary/Secondary/ University)
Functional Dyspepsia ($n = 30$)	48.17 ± 11.15	26/4 (86.6% / 13.3%)	19/7/4 (63.3% / 23.3% / 13.3%)	15/12/3 (50.0%, 40.0%, 10.0%)
Organic Dyspepsia ($n = 29$)	49.55 ± 12.36	18/11 (62.1% / 37.9%)	25/2/2 (86.2% / 6.9% / 6.9%)	14/10/5 (48.2% / 34.4% / 17.2%)
Healthy control ($n = 27$)	41.67 ± 10.35	26/1 (96.2% / 3.8%)	17/8/1 (65.3% / 30.7% / 3.8%)	6/13/7 (22.2% / 48.1% / 25.9%)

The canonical discriminant function was statistically significant, X^2 (4) = 21.64, $p < .001$, and accounted for 90% of the variance in groups. As Table 3 illustrates, depression had the highest discriminator of groups (standardized canonical discriminant function coefficient = 1,036). It is followed by the perceived social support from family members (standardized canonical discriminant function coefficient = 0,967). Compared with OD and healthy controls, FD patients are more likely to have higher depressive symptoms. OD patients, on the other hand, had lower perceived social support from their family members.

Discussion

In this study, we examined whether FD can be distinguished from organic dyspepsia and healthy control conditions based on the psychiatric and psychosocial profiles of FD patients. The analyses revealed that higher depression, higher trait anxiety and higher tendency of insecure attachment – anxious-avoidant attachment - significantly discriminated FD group from dyspepsia with organic etiology.

The most critical finding is an insecure attachment form - anxious-avoidant attachment profile - of FD patients discriminates them from OD, while accounting for other attachment profiles and psychopathological symptoms. This is in alignment with our a priori predictions. As mentioned before, anxious-avoidant attachment is characterized by distrust to others where the person has a tendency of denying emotional bonding needs and avoiding close relationship with others [8]. This might alleviate their support seeking in the face of daily hassles or adverse life events, such as under the condition of pain [20] and increase pure coping with distress of physical disorders [9]. Hence, anxious-avoidant attachment might predispose patients with dyspeptic symptoms to have problems in regulating their negative emotions and distress, resulting in higher depression and anxiety, which might fuel their dyspeptic complaints despite of any organic reason.

Indeed, in accord with their anxious-avoidant attachment profile, FD patients have higher depression and trait anxiety tendencies compared to the organic counterpart. The positive relation between FD and higher depression is in line with past research [32,38] and in contrast to studies that reported no such group differences [46]. In similar, higher trait anxiety in FD patients supports past research that showed anxiety is a profound characteristic of FD patients compared to OD or healthy controls [30,27,32,34,36,37,39,43,44]. These findings are interesting given the lack of significant group differences on dyspeptic symptoms as presented on Table 2. Indeed, when we questioned how much their physical complaints affect their overall life, FD patients reported higher impact of their dyspeptic symptoms on their lives than OD patients. Though suffering from similar types of dyspeptic symptoms, patients with FD might be more inclined to be depressively ruminative and anxious about their symptoms and health condition, compared to OD counterparts.

Table 2. Dyspeptic symptoms in functional and organic dyspepsia groups.

	Functional Dyspepsia n (%)		Organic Dyspepsia n (%)	
	Present	Not-present	Present	Not-present
Epigastric pain	14 (58.3%)	10 (41.6%)	17 (68.0%)	8 (32.0%)
Postprandial distension	18 (75.0%)	6 (25.0%)	14 (58.3%)	10 (41.6%)
Distension	20 (83.3%)	4 (16.6%)	12 (50.0%)	12 (50.0%)
Early satiety	8 (33.3%)	16 (66.6%)	6 (25.0%)	18 (75.0%)
Nausea	8 (34.7%)	15 (65.2%)	4 (16.0%)	21 (84%)
Vomiting	2 (8.3%)	22(91.6%)	3 (12.0%)	22 (88.0%)
Epigastric burning	6 (26.0%)	17(73.9%)	6 (25.0%)	18(75.0%)
Belching	19 (79.1%)	5 (20.8%)	11 (45.8%)	13 (54.1%)
Retrosternal burning	2 (8.3%)	22 (91.6%)	5 (20.8%)	19 (79.1%)
Sour taste in mouth	3 (12.5%)	21 (87.5%)	4 (16.6%)	20 (83.3%)
Recovery with food or water	2 (8.3%)	22 (91.6%)	8	15
Dyspeptic symptoms during night	3 (15.7%)	16 (84.2%)	11 (45.8%)	13 (54.1%)
Weight loss	3 (12.5%)	21 (87.5%)	2 (8.3%)	22 (91.6%)
Perceived effect of physical complaints on their life in general*	High effect 16 (53.3%)	Moderate to low effect 14 (46.7%)	High effect 6 (20.7%)	Moderate to low effect 23 (79.3%)

*chi-square test, p value <0.05 described as significance level.

Table 3. Results of discriminant analysis: Comparison of psychiatric and psychosocial parameters between healthy controls, functional and organic dyspepsia patients.

	FD	OD	HC	Wilks' Lambda	F	p
Depression	16.16(0.87)	9.33 (6.85)	12.00 (5.43)	0.876	4.322	*0.018*
Trait anxiety	2.44 (0.47)	2.07 (0.46)	2.20 (0.36)	0.889	3.792	*0.028*
Somatization	1.72 (1.31)	1.33 (1.56)	1.37 (1.08)	0.980	0.622	0.541
Alexithymia	.49 (0.17)	0.41 (0.17)	0.44 (0.16)	0.958	1.324	0.274
Perceived social support from significant others	23.60 (0.533)	18.92 (8.67)	22.74 (6.24)	0.932	2.233	0.116
Perceived social support from family	23.72 (4.73)	19.92 (8.05)	24.74 (4.72)	0.903	3.278	*0.044*
Perceived social support from friends	20.36 (6.53)	17.17 (5.81)	21.07 (5.48)	0.943	1.828	0.169
Secure attachment	3.28 (0.55)	3.28 (0.49)	3.31 (0.44)	0.999	0.029	0.972
Anxious-ambivalent attachment	2.07 (0.41)	2.13 (0.47)	2.12 (0.38)	0.996	0.123	0.884
Anxious- avoidant attachment	2.79 (0.53)	2.40 (0.35)	2.76 (0.45)	0.907	3.140	*0.050*

Our results further indicate that alexithymia and somatization did not significantly discriminate FD patients from OD patients or healthy controls, while accounting for attachment, depression and anxiety. These findings are in contrast to our expectations and previous findings in the literature. Past research indicated problems in emotion processing for FD patients and higher scores of alexithymia compared to healthy controls (e.g. [50–52]. Similarly, somatization was found as more common in FD patients compared to controls [60,61]. One reason of the lack of significant group difference in the current study might be the inclusion of attachment and depression in the multivariate analyses. Indeed, post-hoc analyses on the somatization symptoms without accounting for other variables revealed higher scores for FD patients compared to others at marginally significant levels. Hence, examining each psychiatric condition's relative contribution to the FD condition might provide more precise picture of FD etiology, rather than making group comparisons separately for each psychiatric diagnosis.

The other reason of the lack of group difference on the somatization and alexithymia might be attributable to relatively low sample sizes in the current study: the sample sizes of range from 27 to 30. Although MANOVA and discriminate analysis are robust to such a sample size range (Heine et al., 2012*), relatively low sample size might not capture population level variations in alexithymia or somatization. For example, low standard deviations of alexithymia scores across groups (see, Table 3) might be signalling the probability of such low variance of this condition within and between groups in the present study. We highly recommend future research to replicate our findings with higher sample sizes.

Lastly, we found significant group differences on perceived social support from family members. Low perceived support from family discriminates OD patients from FD patients and healthy controls. OD patients seem to perceive lower levels of help from their family. To the extent of our knowledge, this is the first empirical finding that distinguishes FD and OD patients on perceived social support. However, unlike past research [27,26] and in contrast to our expectations, FD patients and healthy controls did not differ on this support dimension. Given the higher depressive and trait anxiety levels, one would expect lower perceptions of support from family for FD patients compared to OD patients and healthy controls. The perceptions on the availability of support from the FD patients' social environment might not buffer their symptoms. Future research might explore other psychosocial factors, such as their coping styles rather than social support, which might mitigate FD patients' anxious-avoidant profiles as well as depressive and anxious tendencies.

In conclusion, the present study found that FD patients can be discriminated by OD patients and healthy controls in terms of their higher anxious-avoidant attachment profile as well as their higher propensity to have depressive and anxiety symptoms. Multidisciplinary approach needs in following up of FD patients. Psychological evaluation and treatment would increase the life quality of dyspepsia patients.

Ethical Adherence: The study was approved by the local ethics committee (Approval Date: 15 July 2005, Approval Number: MAR-YÇ-2005-0143).

Disclosure statement

No potential conflict of interest was reported by the authors.

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