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Original

Impact of functional dyspepsia on quality of life in eating disorder patients: the role of thought-shape fusion

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Abstract

Objective: **The study begins by analysing the psychometric properties of the Nepean Dyspepsia Index-Short Form (NDI-SF), before moving on to study quality of life in patients with functional dyspepsia (FD) and the psychopathological features that underlie the disorder in three groups of subjects: patients with eating disorders (ED), psychiatric patients (non-ED), and a group of students, all of whom fulfilled Rome III criteria for FD. The analysis specifically focused on the relationship between thought-shape fusion (TSF) and functional dyspepsia, and hence on the potential repercussions this could have on the quality of life of patients with eating disorders.**

Methods: **The sample comprised 78 ED outpatients, 77 non-ED outpatients, and 90 university students, all of them with associated FD (Rome III criteria). The mental disorders (ED and non-ED) fulfilled the diagnostic criteria of DSM IV-RT. In all cases, the symptoms of dyspepsia, the related quality of life, anxiety, depression, and TSF were determined.**

Results: **Satiation and bloating were significantly higher in ED patients. Correlations between dyspepsia and TSF were initially positive and significant in all cases, but significance was only maintained in the group of ED patients after controlling for the other psychopathological variables. Regarding the ED group, the regression analysis revealed the following predictors of quality of life: dyspepsia, depressive symptomatology, TSF-conceptual, TSF-interpretative and total TSF.**

Discussion: **The cognitive distortion of TSF appears to constitute a general bias common to all eating disorders, with specific effect on the characteristic symptoms of FD.**

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Key words: *Functional dyspepsia. Thought-shape fusion. Eating disorders. Validation.*

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IMPACTO DE LA DISPEPSIA FUNCIONAL SOBRE LA CALIDAD DE VIDA EN LOS TRASTORNOS DE LA CONDUCTA ALIMENTARIA: PAPEL DE LA FUSIÓN PENSAMIENTO-FORMA

Resumen

Objetivo: **se analizaron las propiedades psicométricas del Nepean Dyspepsia Índex-Short Form (NDI-SF), previo al estudio de la calidad de vida en pacientes con dispepsia funcional (DF) y variables psicopatológicas subyacentes a dicho trastorno en pacientes con trastornos de la conducta alimentaria (TCA), pacientes psiquiátricos (no TCA) y un grupo de estudiantes, todos ellos con criterios Roma III de DF. El análisis se centró específicamente en la relación entre la fusión pensamiento-forma (TSF) y la DF, y en las repercusiones que ello podría tener en la calidad de vida de los pacientes TCA.**

Métodos: **la muestra comprendía pacientes en tratamiento ambulatorio (78 con TCA y 77 no TCA, con criterios DSM IV-TR) y 90 estudiantes universitarios, todos ellos con DF (criterios de Roma III). Se valoraron los síntomas de dispepsia, la calidad de vida relacionada con ella, la ansiedad, la depresión y el constructo TSF.**

Resultados: **La saciedad y la hinchazón fueron significativamente mayores en los pacientes TCA. Las correlaciones entre la dispepsia y TSF fueron positivas y significativas en todos los casos, pero sólo se mantuvo la significación en el grupo de pacientes TCA tras controlar el resto de variables psicopatológicas. En cuanto al grupo de TCA, el análisis de regresión reveló los siguientes predictores de la calidad de vida: dispepsia, sintomatología depresiva, TSF-conceptual, TSF-interpretativo y TSF total.**

Discusión: **la distorsión cognitiva TSF parece constituir un sesgo general, común a todos los TCA, con efecto específico sobre los síntomas característicos de dispepsia funcional.**

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Palabras clave: *Dispepsia funcional. Fusión pensamiento forma. Trastornos de la conducta alimentaria. Validación.*

Abbreviations

ANOVA: Analyses of variance.
BDI: Beck Depression Inventory.
DSM IV-RT: Diagnostic and Statistical Manual of Mental Disorders IV-Revised Text.
ED: Eating Disorders.
FD: Functional dyspepsia.
KMO index: Kaiser-Meyer-Olkin index.
NDI-SF: Nepean Dyspepsia Index-Short Form.
NDI: Nepean Dyspepsia Index.
SPSS: Statistical Package for Social Sciences.
STAI: State-Trait Anxiety Inventory.
TSF-Q: Thought Shape Fusion-Questionnaire.
TSF: Thought Shape Fusion.
VAS: Visual Analogue Scales.

Introduction

Functional dyspepsia (FD) has a complex physiopathology that involves not only aspects related to stomach motility, such as delayed gastric emptying or hypersensitivity to gastric distension, but also psychological aspects such as stress, anxiety or depression.[1,2] It most commonly manifests in the form of epigastric pain or burning, postprandial fullness and early satiation after meals.[3] These symptoms, along with bloating and belching, which are also characteristic of FD, are also frequently observed in patients with eating disorders (ED),[4-7] who in fact experience a wide variety of gastrointestinal manifestations.[8,9] For example, bloating, which is a characteristic symptom of FD, affects 10-25% of the general population, but it is much more common in people with anorexia nervosa, constipation or irritable bowel syndrome.[10] Indeed, the sensation of bloating, together with general malaise and constipation, is frequently reported by patients with anorexia and bulimia nervosa.[11,12] Numerous dyspeptic symptoms have also been observed in people with binge eating disorder.[13]

An intolerance to many foods, which is a common complaint among the general population, usually manifests in the form of abdominal pain, bloating and changes in intestinal regularity, and often meets the criteria for irritable bowel syndrome or dyspepsia, and sometimes for both. In patients with ED, the reporting of such intolerance and symptoms is related to one of the most clinically relevant aspects from a psychological point of view, namely interoceptive awareness.[14]

The pathogenesis of FD is not well understood, although in the Rome III criteria it is associated with early life, certain psychosocial factors and the actual physiology of the gastrointestinal tract.[15] A number of genetic and environmental factors in the first years of life also appear to be important in the development of FD.[16-18]

The symptoms of FD lead patients to feel distressed and unwell, with the consequent effect on their quality of life,[19] and it is therefore essential to have instruments capable of measuring these repercussions.[20,21]. Indeed, there is evidence that people with FD do have a reduced quality of life,[22-25] with notable predictors of this being anxiety[25] and depressive symptoms.[26] Alongside the symptoms of anxiety and depression one of the psychological factors that have been studied most recently in the context of FD is perfectionism,[27] a personality trait that is closely related to obsessiveness. One important construct that has been analysed in the context of the latter is what is referred to as thought-action fusion, a cognitive distortion whose equivalent in ED is thought-shape fusion. People who show this distortion know, rationally, that thinking about eating forbidden foods does not really make them gain weight or change their body shape, but this does not stop them from feeling it is so on an emotional level.[28,29]

As regards instruments for measuring quality of life in people with FD one of the most widely used is the Nepean Dyspepsia Index (NDI),[27] complemented more recently by its 10-item short form (NDI-SF).[30] The short form includes five subscales concerning tension, interference with daily activities, eating/drinking, knowledge/control, and work/study. Each subscale comprises two items which are scored on a five-point Likert scale, thereby yielding a subscale score between 2 and 10 and an overall quality-of-life score between 10 and 50. The higher the score, the worse the respondent's quality of life as a result of the symptoms. The NDI-SF has shown adequate internal consistency (Cronbach's alpha ≥ 0.70 for all subscales) and a significant correlation with the subscales of the NDI.

The present study begins by analysing the psychometric properties of the NDI-SF, before moving on to study quality of life in patients with FD and the psychopathological features that underlie the disorder in three groups of subjects: patients with eating disorders (ED), psychiatric patients (non-ED), and a group of students, all of whom fulfilled Rome III criteria for FD. The analysis specifically focused on the relationship between thought-shape fusion and functional dyspepsia, and hence on the potential repercussions this could have on the quality of life of patients with eating disorders.

Method

Participants

The total sample comprised 245 people (mean age 28.36 ± 11.26 years; 189 women and 56 men). Of these, 78 were ED patients with associated FD (70 women and 8 men, mean age 22.88 ± 8.28 years), 77 were patients with other psychiatric disorders (anxiety, depression and adaptive disorders) and associated FD (43 women and 34 men, mean age 40.78 ± 9.40 years), and 90 were university students with FD (76 women and 14 men, mean age 22.49 ± 4.27 years). FD was diagnosed according to Rome III criteria, while the var-

ious mental disorders (ED and non-ED) fulfilled the relevant diagnostic criteria of DSM IV-RT.[31] All the patients were receiving out-patient treatment. In the case of the students, the current presence or a history of ED and other mental disorders was ruled out. Written informed consent was obtained from all subjects and the questionnaire data was collected anonymously. All the data were collected by means of interviews conducted during the period January 2009 to January 2010.

Instruments

Patient Symptom Questionnaire:
Visual Analogue Scales (VAS)

This self-report instrument gathers information about the following symptoms: postprandial fullness, early satiation, bloating, epigastric discomfort (an ache or discomfort after eating, poorly localised), epigastric pain (a sharp, easy-to-pinpoint pain after eating), postprandial nausea, belching after meals, and vomiting. Respondents mark the severity of each symptom on a 100-mm visual analogue scale, and the score on each of the eight subscales is then added to give a total score. Overall severity therefore ranges between 0 and 800 mm. Visual analogue scales have been shown to be sensitive to changes in symptom intensity and are a well-accepted instrument for evaluating such symptoms.[32] In accordance with the criteria of Talley et al.[32] the cut-off point for evaluating symptom severity was set at 149 mm, while that for postprandial fullness was 29 mm.

Nepean Dyspepsia Index-Short form (NDI-SF)

This is a 10-item short form of the Nepean Dyspepsia Index, an instrument developed by Talley et al.[33] to assess quality of life in patients with FD. For the quality-of-life areas, the impact of the illness is considered to occur in two dimensions: interference with a subject's ability to perform or engage in the area (e.g. a reduced ability to spend time with friends because of dyspepsia); and interference with their enjoyment of that area of life (e.g. impaired enjoyment of time spent with friends because of dyspepsia). The instrument measures five areas (tension, interference with daily activities, eating/drinking, knowledge/control, and work/study), with two items referring to each area. Each item is scored on a five-point Likert scale (1 = not at all, 2 = a little, 3 = moderately, 4 = quite a lot, and 5 = extremely), and thus the possible score on each subscale ranges from 2 to 10. The original form of the NDI-SF shows adequate internal consistency (Cronbach's alpha between 0.70 and 0.76 for the five subscales) and a highly significant correlation (0.77-0.93) with all the items on the NDI. The index is shown in Appendixes A (English version) and B (Spanish version).

State-Trait Anxiety Inventory (STAI)

A 40-item, self-report questionnaire that measures state anxiety (STAI-S) and trait anxiety (STAI-T). Items are scored from 0 to 3, where 0 = not at all and 3 = a lot. As regards reliability and discriminant validity the STAI items show a sufficient ability to discriminate and differentiate (between age, sex, and anxiety levels) and have a good internal consistency (between 0.90 and 0.93 for the STAI-S and between 0.84 and 0.87 for the STAI-T). The convergent validity with respect to other measures of anxiety ranges from 0.58 to 0.79.[34] The present study used the Spanish version of the STAI.[35]

Beck Depression Inventory (BDI)

This measures the intensity of depression and is used as a screening test in the general population. It is a self-report instrument comprising 21 items and four response levels (0 to 3 for each item). The scores obtained are linked to three categories: absence of depression (0-9), dysthymia or mild depression (10-15), and depression (over 15). The Beck Depression Inventory shows adequate reliability (0.93) and a convergent validity between 0.62 and 0.66.[36] The present study used the Spanish version of the BDI.[37]

Thought-Shape Fusion Questionnaire (TSF-Q)

The TSF-Q measures the fusion between thought and body shape or image.[28,29] It is a 34-item, self-report questionnaire which is divided into two sections: a conceptual section comprising 17 items and which measures the importance attached to thoughts related to eating and the body, and an interpretative section, also comprising 17 items and which evaluates how these thoughts are interpreted by participants. Each item is scored from 0 to 4 (where 0 = not at all and 4 = totally) according to how much the subject agrees with its content. The questionnaire has been shown to have high internal consistency (Cronbach's a of 0.95 for the conceptual subscale and 0.97 for the interpretative one) and discriminates between clinical and non-clinical samples.[29] The Spanish version of the TSF-Q was obtained through a translation and back-translation process, using independent translators for the two procedures. The factor analysis of the 34 items of the TSF-Q revealed two factors that corresponded to the two sections identified by its authors: *conceptual* and *interpretative*. These two factors accounted for 53.18% of the variance in the sample of patients and 56.37% in the group of undergraduates. The *conceptual* section or

Table I
Correlations between FD and TSF, before and after controlling for other variables (STAI, BDI)

	Dyspepsia ED patients		*Dyspepsia students*		*Dyspepsia psychiatric patients*	
	Before	*After*	*Before*	*After*	*Before*	*After*
TSF-Conceptual	0.42**	0.35**	0.30**	0.13	0.44**	0.21
TSF-Interpretative	0.41**	0.39**	0.29*	0.15	0.39**	0.19
TSF-Total	0.43**	0.35**	0.31**	0.16	0.44**	0.23

*p < 0.05; ** p < 0.01; rest are non-significant.

subscale measures the importance attached to thoughts related to eating and the body, while the *interpretative* section or subscale evaluates the way in which participants interpret such thoughts. The internal consistency of the Spanish version of the TSF-Q and its subscales was determined by means of Cronbach's alpha, with values ranging between 0.93 and 0.96.[38]

Statistical analysis

Data are expressed as means and standard deviations. The proportion of men and women was considered for the study of sex differences among the three groups of subjects, this being done by applying the c^2 test. Analysis of variance (ANOVA) was performed to study group-based differences (age, dyspepsia), in conjunction with the post hoc Bonferroni multiple comparison test. The associations between variables were studied by means of Pearson's correlation coefficient. The factor analysis was based on the principal axes approach, while Cronbach's alpha was used to determine the internal consistency of the NDI-SF. Finally, a multiple regression analysis was carried out to identify any variables that might predict quality of life in the context of FD. All the analyses were performed using the Statistical Package for Social Sciences (SPSS, v. 18.0 for Windows, SPSS Inc, Chicago)[39] and the level of significance was set at the 0.05 level.

Results

There were significant differences in the age of the three groups ($F_{2, 242} = 153.71$; $p < 0.001$), with the group of psychiatric patients being significantly older. However, age was not correlated with dyspepsia scores ($r = 0.01$; $p = 0.86$), nor with scores on the TSF-Q as a whole ($r = 0.03$; $p = 0.61$) or either of its two subscales (conceptual: $r = 0.05$; $p = 0.39$; interpretative: $r = 0.03$, $p = 0.69$).

There were also significant differences between the groups in terms of the proportion of men and women ($\chi^2 = 29.55$; $p < 0.01$). However, no gender differences appeared when comparing scores for dyspepsia ($F_{1, 242} = 0.005$; $p = 0.94$), TSF-Q conceptual ($F_{1, 239} = 1.81$; $p = 0.18$), TSF-Q interpretative ($F_{1, 238} = 0.09$; $p = 0.77$) or TSF-Q total ($F_{1, 238} = 0.91$; $p = 0.34$).

These results for age and sex mean that the remaining analyses can be conducted without the risk of significant bias due to these variables.

Dyspepsia according to the Patient Symptom Questionnaire (VAS)

The total score on the VAS revealed no significant differences between the three study groups. However, there were significant differences with respect to feeling satiated ($F_{2, 241} = 14.43$; $p < 0.001$) and bloating ($F_{2, 241} = 3.09$; $p < 0.05$), the scores for which were significantly higher among ED patients compared to the other two groups. Both groups of patients reported a significantly greater presence of postprandial abdominal pain, both diffuse ($F_{2, 241} = 3.94$; $p < 0.05$) and localised ($F_{2, 241} = 3.11$; $p < 0.05$), although there was no significant difference between these two groups themselves. Finally, vomiting after meals was more common among psychiatric patients ($F_{2, 241} = 4.68$; $p < 0.05$), there being no significant difference between students and ED patients.

Correlations between functional dyspepsia (VAS scores) and thought-shape fusion (TSF)

Table I shows the correlations between the total VAS score and scores on the TSF-Q (conceptual and interpretative subscales, and total score). Although these correlations were initially positive and significant in all cases, significance was only maintained in the group of ED patients after controlling for the other psychopathological variables considered (state anxiety, STAI-S; trait anxiety, STAI-T; depressive symptoms, BDI). In this ED group the highest correlations shown by the TSF-Q (total and subscales), after controlling for the other variables, were with bloating (0.31 for TSF-Q conceptual, $p < 0.01$; 0.38 for TSF-Q interpretative, $p < 0.01$; 0.36 for TSF-Q total, $p < 0.01$), a diffuse painful feeling (0.38 for TSF-Q conceptual, $p < 0.01$; 0.39 for TSF-Q interpretative, $p < 0.01$; 0.44 for TSF-Q total, $p < 0.01$), nausea (0.38 for TSF-Q conceptual, $p < 0.01$; 0.41 for TSF-Q interpretative, $p < 0.01$; 0.24 for TSF-Q total, $p < 0.05$), and total dyspepsia score (0.35 for TSF-Q conceptual, $p < 0.01$; 0.39 for TSF-Q interpretative, $p < 0.01$; 0.35 for TSF-Q total, $p < 0.01$).

Table II
Factor structure (principal axes) and explained variance of the NDI-SF in the three groups

Item	ED patients	Non-ED patients	Students
	Factor 1	Factor 1	Factor 1
NDI-SF1	**0.910**	**0.817**	**0.785**
NDI-SF2	**0.863**	**0.863**	**0.806**
NDI-SF3	**0.922**	**0.943**	**0.831**
NDI-SF4	**0.918**	**0.954**	**0.818**
NDI-SF5	**0.747**	**0.798**	**0.756**
NDI-SF6	**0.841**	**0.781**	**0.760**
NDI-SF7	**0.644**	**0.746**	**0.715**
NDI-SF8	**0.479**	**0.717**	**0.520**
NDI-SF9	**0.703**	**0.871**	**0.642**
NDI-SF10	**0.719**	**0.860**	**0.723**
Explained variance	61.86%	70.28%	58.90%

Quality of life and functional dyspepsia

In order to apply the Nepean Dyspepsia Index-Short form (NDI-SF) to the present sample the instrument was first subjected to a process of translation and back-translation involving two independent translators. The subsequent factor analysis was based on the principal axes method, which offers better estimates than does the principal components approach as it is based on the factor model. The suitability of the analysis was confirmed by indicators showing the high degree of inter-relationship between the variables. Specifically, in the sample of ED patients, Bartlett's test of sphericity gave $X^2 = 762.63$ ($p < 0.0001$), while the value of the Kaiser-Meyer-Olkin (KMO) index was 0.86. In the group of students, Bartlett's test gave $X^2 = 708.69$ ($p < 0.0001$) and the KMO index was 0.83. Finally, in the sample of psychiatric patients (non-ED), Bartlett's test gave $X^2 = 940.77$ ($p < 0.0001$) and the KMO index was 0.88. The number of factors was determined by considering those with eigenvalues greater than 1, in conjunction with visual examination of the scree plot. The best solution revealed a single factor, quality of life, which accounted for 61.86%, 54.90% and 70.28% of the variance in the ED, student, and psychiatric patient groups, respectively. The factor loadings and explained variance for each group are shown in table II.

The internal consistency of the NDI-SF was determined by means of Cronbach's alpha coefficient, which yielded values of 0.938, 0.918 and 0.959 in the groups of ED patients, students, and non-ED psychiatric patients, respectively.

NDI-SF in the different groups

Table III shows the scores obtained by the two patient groups and the group of students on the NDI-SF. It can be seen that both the patient groups (ED and non-ED) scored significantly higher than did students, both in terms of the total score and scores on the five subscales. The post hoc Bonferroni tests revealed no significant differences between the two patient groups on the first three areas assessed by the instrument (tension, daily activities, and eating/drinking). However, in the area of knowledge/control, sub-area of control, the highest scores correspond to non-ED psychiatric patients, who show a significant difference with respect to the ED group, even though the overall scores

Table III
Means (SD) for the different areas and total score of the NDI-SF

Area	ED patients	Non-ED patients	Students	p
Emotional wellbeing	2.33 (1.49)	2.08 (1.39)	1.35 (0.78)	< 0.0001
Tension	2.47 (1.44)	2.14 (1.38)	1.46 (0.78)	< 0.0001
TENSION	4.81 (2.86)	4.22 (2.65)	2.82 (1.50)	< 0.0001
Engagement	2.06 (1.42)	2.26 (1.57)	1.31 (0.71)	< 0.0001
Enjoyment	1.95 (1.35)	2.32 (1.58)	1.32 (0.70)	< 0.0001
DAILY ACTIVITIES	4.01 (2.71)	4.58 (3.10)	2.65 (1.35)	< 0.0001
Eating/Drinking	2.29 (1.42)	2.17 (1.27)	1.53 (0.89)	< 0.0001
Enjoyment	2.32 (1.56)	2.12 (1.34)	1.51 (0.81)	< 0.0001
EATING/DRINKING	4.62 (2.77)	4.29 (2.44)	3.03 (1.63)	< 0.0001
Duration	2.32 (1.51)	2.01 (1.34)	1.31 (0.75)	< 0.0001
Control	1.33 (0.91)	1.89 (1.39)	1.33 (0.72)	< 0.0001
KNOWLEDGE/CONTROL	3.65 (2.09)	3.91 (2.55)	2.63 (1.31)	< 0.0001
Ability	1.68 (1.16)	2.33 (1.54)	1.24 (0.60)	< 0.0001
Enjoyment	1.68 (1.12)	2.37 (1.62)	1.30 (0.65)	< 0.0001
WORK/STUDY	3.36 (2.28)	4.70 (3.15)	2.56 (1.19)	< 0.0001
NDI TOTAL	20.47 (10.85)	21.72 (12.35)	13.47 (5.30)	< 0.0001

for this area reveal no significant differences between the two patient groups. There are also differences between the two groups of patients in the area of work/study, with the highest scores again corresponding to non-ED patients. Comparison of students and ED patients in this area revealed that the ability to work/study was more affected in ED patients than among students ($p < 0.05$), although this was not the case for the ability to enjoy work/study. Thus, there are differences regarding the actual ability to work/study but not in terms of being able to enjoy it. It should be noted, however, that the global results for this area show no differences between ED patients and students. Finally, the total NDI-SF score revealed no significant differences between the two patient groups.

Prediction of quality of life as related to functional dyspepsia in ED patients

A stepwise multiple regression analysis (entering as predictive variables the total dyspepsia score (VAS), state and trait anxiety (STAI-S and STAI-T), depressive symptomatology (BDI), the conceptual and interpretative subscales of the TSF, and the total TSF score) revealed the following to be predictors of quality of life: total dyspepsia score ($B = 0.022$, $SE = 0{,}004$; $b = 0.27$; $p < 0.0001$), depressive symptomatology ($B = 0.27$, $SE = 0.041$; $b = 0.38$; $p < 0.0001$), score on the TSF-conceptual subscale ($B = 0.22$, $SE = 0.045$; $b = 0.25$; $p < 0.0001$), score on the TSF-interpretative subscale ($B = 0.24$, $SE = 0.043$; $b = 0.37$; $p < 0.0001$) and total TSF score ($B = 0.23$, $SE = 0.039$; $b = 0.29$; $p < 0.0001$). State and trait anxiety did not emerge as significant predictors.

Discussion

The pathogeny of FD remains unclear and the Rome III criteria mention a number of psychosocial factors, among others, that may be involved.[15] Most patients with ED present gastrointestinal symptoms, and although ED and FD have a different pathogenesis the two disorders do share certain symptoms, both digestive and those related to psychopathology (such as anxiety and depression). They also show similarities as regards the use of certain coping strategies,[4] as well as in terms of physiological gastrointestinal factors such as visceral hypersensitivity, gastric emptying and acid secretion.[1,2,40] One psychological factor that has recently been studied in the context of FD is perfectionism, which, in turn, has been shown to be a characteristic feature of obsessions.[41] With respect to obsessive behaviour, research has highlighted the role of a cognitive distortion known as thought-action fusion, which in the context of ED has an equivalent in the form of thought-shape fusion (TSF). TSF is considered to be based on three beliefs about the consequences of thinking about eating forbidden foods: a) the belief that such thoughts make it more likely that a person will gain weight or change his/her shape (TSF likelihood); b) the belief that having such thoughts is as immoral as actually eating the food (TSF moral); and c) the belief that having such thoughts makes the person feel fat (TSF feeling).[29] In the original description of TSF the authors started from the hypothesis that people who make this distortion know rationally that thinking about forbidden foods does not really cause weight gain or changes in body shape, although this does not stop them from feeling it is so on an emotional level.[28,29] The present study shows that two of the symptoms of FD (feeling satiated and bloating) are more common among ED patients, this being consistent with previous findings.[42,43] Moreover, the correlations between TSF and the symptoms of FD only remained significant (after controlling for other variables) in ED patients, which could be related to the increased visceral sensitivity and altered stomach emptying and acid secretion that have been previously reported in such patients.[1,2,30] In this regard, the cognitive distortion of TSF would contribute, to varying degrees, to dyspeptic discomfort via the thoughts related to food intake and body image. Indeed, TSF implies an ego-dystonic response to the anxiety produced by possible bodily changes that the person believes could result purely from having certain thoughts about eating.[28,29] This perceived stress related to the body may, in other more general aspects, be equivalent to the experience of everyday stress reported by many FD patients prior to consulting their physician. Similarly, the experience of anxiety is capable of producing abdominal symptoms, as is the distress caused by self-criticism. Both these aspects, i.e. anxiety and critical thoughts related to the body, are very common among ED patients, in whom many digestive symptoms are also present.[27] It is not surprising, therefore, that situations of conflict and various psychopathological states are accompanied by alterations to digestive tract motility, which is then expressed clinically in the form of dyspepsia. There is a notable prevalence of these complaints among ED patients, with 66% presenting symptoms such as gastric/abdominal fullness, and 75% of bulimic patients reporting abdominal distension.[42,43]

As regards quality of life in the context of FD the most notable finding concerns the greater repercussions of FD on the area of work/study, this being more evident in the two patient groups. Furthermore, and in contrast to the other areas, ED patients were more affected in this regard than were students, a finding which could have particular significance. Indeed, the hyperactivity of many of these patients centres on academic and/or work-related tasks, and, in the context of the disorder, this only appears to be limited by symptoms such as those produced by FD. In line with previous reports[26] the present study also found that depressive symptoms predict quality of life in FD. However, in contrast to some previous research,[25] anxiety (both state and trait) was not found to predict quality of life among ED patients with FD. Conversely, TSF did show predictive value in this regard, thereby underlining the importance of this construct with respect to the symptomatology and repercussions of FD in ED patients.

In sum, the present study illustrates the relationship between different psychopathology variables (especially the cognitive distortion of TSF) and FD in ED patients. In these patients the characteristic symptoms of FD hinder the therapeutic process, since feeling satiated or bloated prevents sufferers from normalising their eating habits and recovering their physical health. The cognitive distortion of TSF appears to constitute a general bias common to all eating disorders,[28,29] although further research would be required to determine any differences between patients with anorexia and bulimia nervosa as regards this bias and its effect on the characteristic symptoms of FD. A limitation of the present study is that it does not enable this aspect to be adequately explored. To conclude, it is worth noting that the fact that many eating disorders become chronic conditions means that quality of life needs to be a therapeutic objective at all times, and in some case it should be a priority. As quality of life is influenced by the presence of symptoms of FD, these symptoms, as well as the psychological factors which underlie them, must be considered as a primary target of therapeutic intervention.

APPENDIX A

Short form of nepean dyspepsia index (NDI-SF)

Tension

1. Has your general emotional well-being been disturbed by your stomach problems in the last 2 weeks?
   1. Not at all.
   2. A little.
   3. Moderately.
   4. Quite a lot.
   5. Extremely.

2. Have you been irritable, tense or frustrated in the last 2 weeks because of your stomach problems?
   1. Not at all.
   2. A little.
   3. Moderately.
   4. Quite a lot.
   5. Extremely.

Interference with daily activities

3. Has your ability to engage in things you usually do for fun (recreations, going out, hobbies, sports, etc.) been disturbed by your stomach problems in the last 2 weeks?
   1. Not at all.
   2. A little.
   3. Moderately.
   4. Quite a lot.
   5. Extremely.

4. Has your enjoyment of things you usually do for fun (recreations, going out, hobbies, sports, etc.) been disturbed by your stomach problems in the last 2 weeks?
   1. Not at all.
   2. A little.
   3. Moderately.
   4. Quite a lot.
   5. Extremely.

   Not applicable (I have not been able to do any of these things in the past 2 weeks)

Eating/drinking

5. Has your ability to eat or drink (including when, what, and how much) been disturbed by your stomach problems in the last 2 weeks?
   1. Not at all.
   2. A little.
   3. Moderately.
   4. Quite a lot.
   5. Extremely.

6. Has your enjoyment of eating and/or drinking been disturbed by your stomach problems in the last 2 weeks? (Please also include your appetite, and how you feel after food or drink).
   1. Not at all.
   2. A little.
   3. Moderately.
   4. Quite a lot.
   5. Extremely.

Knowledge/control

7. Have you wondered whether you will always have these stomach problems, in the last 2 weeks?
   1. Almost never.
   2. Sometimes.
   3. Fairly often.
   4. Very often.
   5. always.

8. Have you thought that your stomach problems might be due to a very serious illness (e.g. cancer or a heart problem), in the last 2 weeks?
   1. Almost never.
   2. Sometimes.
   3. Fairly often.
   4. Very often.
   5. always.

Work/study

9. Has your ability to work or study been disturbed by your stomach problems in the last 2 weeks?
   1. Not at all.

2. A little.
3. Moderately.
4. Quite a lot.
5. Extremely.
Not applicable (I do not work or study).

10. Has your enjoyment of work or study been disturbed by your stomach problems in the last 2 weeks?
1. Not at all.
2. A little.
3. Moderately.
4. Quite a lot.
5. Extremely.
Not applicable (I have not worked or studied in the last 2 weeks).

APPENDIX B

Short form of nepean dyspepsia index (NDI-SF)

Spanish version

Tensión

1. En las últimas dos semanas, ¿se ha visto alterado tu bienestar emocional por las molestias de estómago?
1. Nada.
2. Un poco.
3. Moderadamente.
4. Bastante.
5. Muchísimo.

2. ¿Te has sentido irritable, tenso o frustrado, en las últimas dos semanas, por tus molestias de estómago?
1. Nada.
2. Un poco.
3. Moderadamente.
4. Bastante.
5. Muchísimo.

Interferencia con las actividades diarias

3. Tu capacidad para involucrarte en lo que te divierte (ocio, hacer deporte, hobbies), ¿se ha visto alterada por tus problemas de estómago en las últimas dos semanas?
1. Nada.
2. Un poco.
3. Moderadamente.
4. Bastante.
5. Muchísimo.

4. ¿Se ha resentido tu capacidad de disfrutar con lo que suele divertirte (ocio, hacer deporte, hobbies, deportes, etc.), por tus problemas de estómago, en las dos últimas semanas?
1. Nada.
2. Un poco.
3. Moderadamente.
4. Bastante.
5. Muchísimo.
No aplicable (no he sido capaz de realizar ninguna de estas actividades en las dos últimas semanas)

Comer/beber

5. Lo que sueles comer o beber (incluyendo cuándo, qué y cuánto), ¿se ha visto alterado en las dos últimas semanas por tus problemas de estómago?
1. Nada.
2. Un poco.
3. Moderadamente.
4. Bastante.
5. Muchísimo.

6. Lo que sueles disfrutar comiendo y/o bebiendo, ¿se ha alterado en las dos últimas semanas por tus problemas de estómago? (Por favor, además ten en cuenta tu apetito y cómo te sientes tras comer o beber).
1. Nada.
2. Un poco.
3. Moderadamente.
4. Bastante.
5. Muchísimo.

Conocimiento/control

7. En las últimas dos semanas, ¿te has preguntado si siempre padecerás esas molestias de estómago?
1. Casi nunca.
2. A veces.
3. Bastante.
4. Muy a menudo.
5. Siempre.

8. En las últimas dos semanas, ¿has pensado que dichas molestias se deban a alguna enfermedad importante (por ejemplo cáncer o enfermedad del corazón)?
1. Casi nunca.
2. A veces.
3. Bastante.
4. Muy a menudo.
5. Siempre.

Trabajo/estudio

9. ¿Se ha resentido tu capacidad de estudio o trabajo, por tus problemas de estómago, en las dos últimas semanas?
1. Nada.
2. Un poco.
3. Moderadamente.
4. Bastante.
5. Muchísimo.
No aplicable (no trabajo ni estudio).

10. ¿Se ha resentido tu capacidad de disfrutar con el estudio o el trabajo, por tus problemas de estómago, en las dos últimas semanas?
    1. Nada.
    2. Un poco.
    3. Moderadamente.
    4. Bastante.
    5. Muchísimo.

    No aplicable (no he trabajado o estudiado en las últimas dos semanas).

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