

Affective distress and fibromyalgia

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Summary

Principles: Elevated rates of lifetime and current psychiatric disorders, elevations of psychological self-report measures assessing depression, anxiety and hypochondriasis have been reported in fibromyalgia syndrome (FMS) patients as well as studies refuting these findings. Studies comparing FMS patients with rheumatoid arthritis (RA) patients provide discrepant data. The aim of this paper is to compare FMS patients with RA patients and healthy controls with respect to psychological measures in a case control design.

Methods: Fifty subjects with FMS, 20 with RA and 42 healthy controls were assessed with respect to anxiety, depression, pain intensity and disability. Three logistical regression models were performed to test whether higher levels of a psychological measure (disability, depression or anxiety) are associated with one disease rather than another,

or with one disease rather than with healthy controls. For each regression model, the best exploratory covariates were determined using receiver operating characteristic (ROC) curves.

Results: In the logistic regression, anxiety scores were the most important covariate determining the likelihood of having FMS whereas depression scores increased the chances of being an RA patient. Age and disability scores did not differ between FMS and RA.

Conclusions: Affective distress is not specific to FMS patients, but the manner in which affective distress is incorporated into the patient's life is worth studying. FMS seems to be associated with anxiety rather than depression.

Key words: *fibromyalgia; rheumatoid arthritis; depression; anxiety; pain; disability*

Introduction

Fibromyalgia syndrome (FMS) is a term used to describe a non-articular rheumatic syndrome whose cardinal features have traditionally been identified as chronic widespread pain in the presence of widespread tenderness [1]. In clinical populations the proportion of patients reporting symptoms fulfilling the criteria for FMS has been estimated to range from 2–22% [1]. Extensive evidence suggests that psychiatric distress occurs at significantly higher rates in FMS patients compared with other chronic pain patients [2]. Comorbid major depression has been diagnosed in 26–80% of FMS patients, while anxiety has been detected in 51–63% of subjects studied [2]. The vast majority of controlled studies which have investigated the relationship between FMS and psychiatric illness have recruited patients from tertiary care centres. Most studies have included a medical comparison group, usually patients with rheumatoid arthritis. Patients with rheumatoid arthritis (RA) are thought to provide an appropriate comparison group because they have a chronic, painful condition that also causes emotional dis-

tress and has a clear “organic” basis. Studies comparing FMS patients with RA provide discrepant data [3]. This may be due to the levels of perceived pain. In most cases, pain in fibromyalgia is rated as more severe than that felt by other chronic pain sufferers [4]. Psychological abnormalities found in FMS patients can be related to the degree of pain, and hence it remains unclear whether the psychological disturbances are causes of fibromyalgia or a product of it [4]. It has been reported that negative emotional states are not only correlated with pain problems, but serve as risk factors to increase the likelihood of pain onset or exacerbation [5]. Elevated rates of lifetime and current psychiatric disorders, elevations in assessing psychological self-report measures, depression, anxiety and hypochondriasis have been reported in FMS patients as well as studies refuting these findings [6]. Many but not all FMS patients exhibit functional impairment and persons with FMS who consult tertiary care centres may be more psychiatrically distressed than those who do not [6, 7]. In this study we set out to test the hypothesis that, having

adjusted for covariates, higher levels of depression or anxiety are associated with FMS rather than RA, or with FMS rather than healthy controls. By comparing ROC curves we investigated whether using

more than one measure improves the ability to distinguish between chronic pain diseases or between fibromyalgia and healthy controls.

Material and methods

Subjects

The study was conducted between May 2002 and February 2003 at the outpatient clinic of Karadeniz Technical University Medical School, a university hospital based in the city of Trabzon in northeastern Turkey. This is a tertiary care referral centre. However, in the Turkish health care system patients may consult specialists directly without referral by a primary care physician. As a result, our study sample represents a mix of tertiary care referral and primary care patients. All consecutive patients diagnosed with FMS according to American College of Rheumatology (ACR) criteria in the outpatient clinic of the Physiotherapy and Rehabilitation Department were interviewed [8]. Patients with current suicidal thoughts, severe heart disease (congestive heart failure or coronary heart disease) or a debilitating neurological condition were excluded from the study, as were patients who had taken psychotropic agents (antidepressants, anxiolytics and antipsychotics) within the previous month. Thirteen subjects were excluded from the study and 50 were found to be eligible. All patients provided informed consent and none refused to participate. All the eligible patients were women. As a medical comparison group consecutive women patients attending the same outpatient clinic with a diagnosis of RA as defined by ACR criteria were approached for the study [9]. Of 25 patients approached, 20 consented and completed the assessments (an 80% response rate). Subjects who consented to be recruited for the study were representative of women with RA attending the outpatient clinic, with no difference in terms of age and duration of illness. The number of RA cases seeking medical care was limited compared with FMS patients in the same period. As a healthy control group randomly selected women with no current or past medical history were assessed. The healthy control group did not report current pain. This group was recruited as part of a public health study assessing health attitudes in the general public. The procedures followed were in accordance with the ethical standards of KTU Medical School and with the Helsinki Declaration of 1975, as revised in 1983.

Procedure

All patients were diagnosed with FMS and RA according to the operational criteria proposed by ACR [8, 9]. The subjects were given the following scales apart from the sociodemographic data form: the Beck Depression Inventory (BDI), the Beck Anxiety Inventory (BAI), and the Fibromyalgia Impact Questionnaire (FIQ), the wording of the FIQ being adapted for the RA patients. Intensity of pain was recorded with the visual analogue scale (VAS) of 100 mm length by patients. All patients were able to complete the questionnaires independently.

Statistics

Three logistic regression models were performed to test whether higher levels of a psychological measure

(FIQ, BDI or BAI) are associated with one disease rather than another, or with one disease rather than with healthy controls. The first and second models were the comparisons of FMS versus healthy controls and RA versus healthy controls using BAI, BDI and age as covariates. In the last model, which used BAI, BDI, VAS, age and FIQ as covariates, FMS patients were compared with RA. For each regression model, the best exploratory covariates were determined using ROC curves. For FMS vs. control and RA vs. control, two ROC curves for each comparison were shown including one for all covariates and one for only the most important covariate. For FMS vs. RA, three ROC curves were shown, one for all covariates, one for only the three significant covariates and one for only the best covariate. The area under the curve (AUC) was given for all curves. Odds ratios and their 95% confidence intervals are reported for all covariates. The cut-off values of these covariates were determined on the basis of the following sensitivity and specificity values.

Measures

A VAS was used for rating of pain intensity by the patients. A 100 mm VAS was used with anchors of “no pain” and of “pain as bad as it could be”. Most studies comparing VAS with numerical and verbal ratings conclude that the VAS or the numerical ratings are statistically preferable to verbal rating scales [10]. The FIQ is a self-report instrument composed of 19 items [11]. The first 10 items comprise a physical functioning scale, with each item rated on a 4-point Likert type scale. On items 11 and 12, subjects indicated the number of days that they felt well or missed work because of fibromyalgia symptoms. Items 13–19 are 10 cm visual analog scales along which subjects rated difficulty in exercising their job responsibilities, pain, fatigue, morning tiredness, stiffness, anxiety and depression. All sub-scores with the exception of the two work-related scores were summed to yield the total score of fibromyalgia impact, which ranges from 0 (no impact) to 80 (maximum impact). The FIQ is widely used in fibromyalgia patients to evaluate both the clinical severity of the disease and the efficacy of different treatments, and has been found to be valid and reliable in Turkish fibromyalgia patients [12]. The FIQ has previously been used to compare FMS and RA patients [13]. The BDI is a 21-item self-report questionnaire which assesses severity of depression [14]. Individuals are asked to rate themselves on a 0 to 3 spectrum (0 = least, 3 = most) with a score range of 0 to 63, the total score being the sum of all items. It has been shown to be valid and reliable in the Turkish version [15]. The BAI is a 21-item self-report questionnaire assessing severity of anxiety [16]. Each item is rated on a 4-point Likert scale ranging from 0 (= not at all) to 3 (= severely, I could barely stand it). The total score ranges from 0 to 63. It has been shown to be valid and reliable in the Turkish version [17].

Results

Fifty women with FMS, 20 women with RA and 42 healthy controls were included in the study. The sociodemographic data of the subjects are given in table 1.

The mean values and standard deviations of study subjects and controls on the measures of anxiety, depression and pain related scales are shown in table 2.

Logistic regression models

Fibromyalgia syndrome vs. healthy controls

In the logistic regression model for FMS cases vs. healthy controls, with BDI, BAI and age as covariates, BDI and age were not significant. Those with higher BAI values were more likely to be in the FMS group. In ROC analysis the area under the curve (AUC) was 0.818 for BAI alone and additional covariates did not increase ability to discriminate (figure 1). A cut-off score for BAI of 15.5 gave a sensitivity of 0.880 and specificity of 0.667. See table 3.

Rheumatoid arthritis vs. healthy controls

In the logistic regression model for RA cases where the BDI, the BAI and age were taken as co-

variates, the BAI and the age variables were found to be non-significant whereas the BDI variable was significant. The B value was in the positive direction, which shows that a rise in BDI values increases the chances of being in the RA group. After the ROC curve analysis the most important covariate was found to be the BDI (AUC = 0.732) (figure 2). Additional covariates did not increase ability to discriminate. When sensitivity was 0.800 and specificity 0.643, the cut-off score for the BDI was 14.5. See table 4.

Fibromyalgia syndrome vs. rheumatoid arthritis

In the logistic regression model where for FMS cases the FIQ, the VAS (pain), the BDI, the BAI and age were taken as covariates; the FIQ and age covariates were found to be non-significant. The BDI, BAI and VAS (pain) covariates were significant. The BDI covariate was found to be significant. Because the B value is in the negative direction, the rise in BDI scores decreases the chances of being in the FMS group. The BAI covariate in the model has been found to be significant. Because the B value is in the positive direction the rise in BAI scores increases the chances of

Table 1

Sociodemographic characteristics of study and control groups.

		FMS (n = 50)		RA (n = 20)		Controls (n = 42)	
		%		%		%	
Education	Literate with no formal schooling	22.0		45.0		23.8	
	Primary school	50.0		30.0		47.6	
	Secondary school	8.0		10.0		9.5	
	High school	20.0		10.0		14.3	
	University	0.0		5.0		4.8	
Marital status	Married	90.0		80.0		88.1	
	Unmarried	4.0		5.0		7.1	
	Widowed	6.0		15.0		4.8	
Economic status	Poor	32.0		40.0		11.9	
	Moderate	52.0		55.0		76.2	
	Good	16.0		5.0		11.9	
		Mean	SD	Mean	SD	Mean	SD
Age		66.8	23.7	45.6	14.9	38.8	10.4
Duration of illness		8.4	7.8	8.9	7.4		

Table 2

Mean values and standard deviations of fibromyalgia patients, rheumatoid arthritis patients and healthy controls for the measures of anxiety, depression and pain.

	FMS	RA	Control
BAI	29.8 (11.6)	19.7 (9.0)	14.8 (12.3)
BDI	18.7 (10.4)	19.5 (9.8)	11.9 (7.1)
FIQ	48.1 (18.1)	44.0 (12.8)	
VAS	66.8 (23.7)	43.4 (24.3)	

BAI: The Beck Anxiety Inventory, BDI: The Beck Depression Inventory, FMS: Fibromyalgia Syndrome, RA: Rheumatoid Arthritis, FIQ: The Fibromyalgia Impact Questionnaire, VAS: Visual Analog Scale for pain

Table 3

Odds ratios and confidence intervals for the FM/HC model.

Covariate	B	S.E.	Sig.	Odds-ratio	95.0% C.I.	
					Lower	Upper
BAI	.099	.021	.000004	1.104	1.059	1.152
BDI	.007	.037	.8596	1.007	.936	1.083
AGE	.007	.027	.7968	1.007	.955	1.061
Constant	-1.998	.515	.0000	.136	-	-

BAI: The Beck Anxiety Inventory, BDI: The Beck Depression Inventory, , FM: Fibromyalgia Syndrome, HC: Healthy Controls

Table 4

Odds ratios and confidence intervals for the RA/HC model.

Covariate	B	S.E.	Sig.	Odds-ratio	95.0% C.I.	
					Lower	Upper
BDI	.113	.039	.004	1.120	1.037	1.209
BAI	–0.0245	.035	.478	.976	.912	1.044
AGE	0.0314	.026	.229	1.032	.980	1.086
Constant	–2.484	.697	.000	.083	–	–

BDI: The Beck Depression Inventory, BAI: The Beck Anxiety Inventory, RA: Rheumatoid Arthritis, HC: Healthy Controls

Table 5

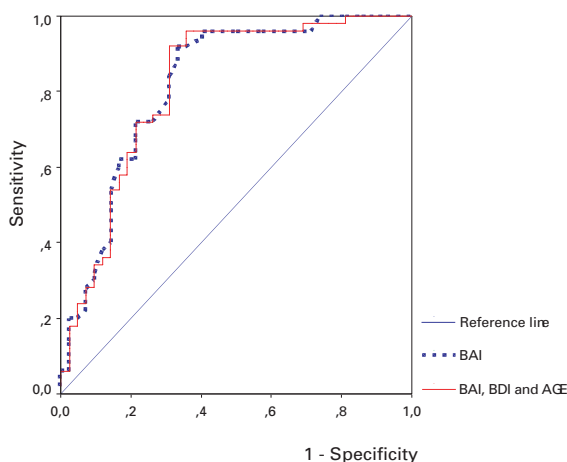
Odds ratios and confidence intervals for the FM/RA model.

Covariate	B	S.E.	Sig.	Odds-ratio	95.0% C.I.	
					Lower	Upper
BDI	–.101	.041	.013	.904	.834	.979
BAI	.110	.040	.005	1.116	1.033	1.206
VAS	.033	.015	.023	1.034	1.005	1.064
FIQ	.016	.026	.528	1.016	.967	1.069
AGE	.0217	.034	.519	1.022	.957	1.092
Constant	–1.673	.947	.077	.188		

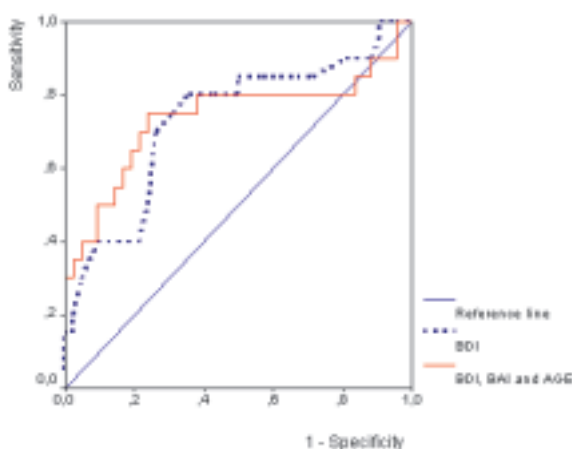
BDI: The Beck Depression Inventory, BAI: The Beck Anxiety Inventory, VAS: The Visual Analog Scale for pain, FIQ: The Fibromyalgia Impact Questionnaire, FM: Fibromyalgia Syndrome, RA: Rheumatoid Arthritis

Figure 1

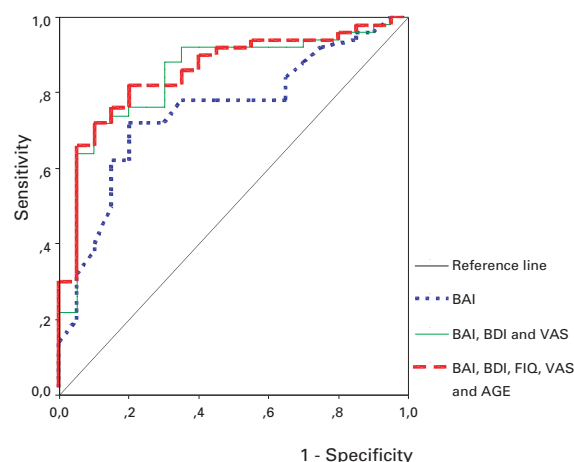
ROC curve for the FM/HC model. For the BDI – BAI – age covariate model, area under curve (AUC) is 0.817, whereas for the BAI covariate model, AUC is 0.818.

**Figure 2**

ROC curves for the RA/HC model. For the model with BDI, BAI and age as covariates AUC is 0.739, for the model with BDI as covariate AUC is 0.732.

**Figure 3**

ROC curves for the FM/RA model. Three ROC curves have been presented: one for all covariates, one for only the three significant covariates (BAI, BDI and pain) and one for only the best covariate (BAI). The AUC value for the model with all covariates is 0.856; for the model with BDI, BAI and VAS as covariates it is 0.847 and for the logistic regression model with BAI as covariate it is 0.751.



being in the FMS group. The VAS (pain) covariate in the model has been found to be significant. Because the B value is in the positive direction the rise in VAS (pain) scores increases the chances of being in the FMS group. After the ROC curve analysis, among the covariates FIQ, VAS, BDI, BAI and age, the most important covariate determining the FMS cases was the BAI (AUC = 0.751) (figure 3). The most important covariate in

determining whether a case was fibromyalgia or rheumatoid arthritis was the anxiety score. Depression scores decrease, but pain and anxiety scores increase the likelihood of a fibromyalgia diagnosis. When the specificity is 0.650, and the selectivity 0.780, the cut-off score for the BAI is 20.5. The odds ratios and the 95% confidence interval for the FMS/RA model are shown in table 5.

Discussion

The idea behind comparing FMS patients with a chronic pain sample such as RA patients is that if those with FMS have more psychiatric problems than patients with RA, then their illness may reflect a 'process of somatisation' rather than a rheumatological disorder [18]. But it is also worth pointing out that even if these groups differ in terms of depression and anxiety, such a finding would not offer "proof" that FMS is a product of somatisation because the inferred process of somatisation is not directly measured. In this case control design study, having adjusted for the degree of perceived pain, we found anxiety to be associated with fibromyalgia syndrome. The role of pain in the genesis of psychiatric distress has been much discussed. There are at least three theoretical views on the relationship of pain and depression: 1. Depression causes pain due to increasing pain sensitivity or as masked depression, 2. Pain causes depression due to the burden and stressful consequences of pain, 3. Pain and depression share the same pathophysiological roots [4]. In a study by Hudson et al. [19] patients with FMS were more likely to be diagnosed with depression (26%) than patients with RA (13%) or controls (12%). Our findings are interesting in the sense that though both FMS and RA patients differ from healthy controls with respect to anxiety and depression measures, they only differ with regard to the measure of anxiety in between. So chronic pain samples are clearly more depressive and anxious than healthy controls. Our findings reveal that anxiety scores determine whether a patient belongs to a fibromyalgia or a rheumatoid arthritis group. The more anxious the patient the more likely is he to suffer from fibromyalgia syndrome. Anxiety has been implicated in the experience of chronic pain. Patients with FMS have also been found to have elevated rates of anxiety disorders [19] with prevalence rates in patients with FMS (44.9%) more than double those of chronic pain controls (21.5%) [8]. When the aim of a study is to investigate whether there is an excess of psychological distress in one chronic pain group (such as FMS) compared with another (such as RA), the duration and severity of the disease must be verified [1]. Verifying for pain helps in verifying for disease severity. But one must bear in mind that FMS (and RA) are associated with many other symptoms, such as fatigue, which appear to have a significant impact on emotional and physical functioning. It would be necessary to check for all of these to truly "equate" the groups. Our chronic pain groups did not differ significantly in terms of duration of illness either. Anxiety scores help us in differentiating an FMS case from a healthy control and also from an RA case. In a study by Aaron et al. [7] a sample of 64 patients with FMS selected from a rheumatology clinic were found to have increased rates of lifetime psychiatric diagnoses when com-

pared to non-patients (persons with FMS who had not sought treatment for their condition) and pain-free controls. We believe that anxiety may lead FMS patients to perceive their somatic sensations as intense and disturbing, and this in turn increases these patients' disability. It has been reported that patients with higher levels of initial anxiety are much more likely to overestimate their pain [5]. Although this is certainly one explanation, it should be pointed out that the non-pain symptoms of FMS (e.g. fatigue, irritable bowel syndrome etc.) could be an alternative explanation for their greater disability. In conclusion, affective distress is not specific to FMS patients, but it would be worth investigating the manner in which affective distress is incorporated into the patient's life. FMS seems to be associated with anxiety rather than depression. Increased anxiety and pain scores increase the likelihood of being an FMS patient, whereas increased depression scores increase the chance of being an RA patient. Age and disability scores did not differentiate FMS from RA cases.

To mention several methodological pitfalls of our study, first, the assessors were not blind to whether patients had FMS or RA, in order to circumvent possible assessor bias. But since all our measures are self-report instruments such bias must be regarded as minimal. We have recruited clinical samples in our study rather than a representative cross-section of the population with FMS. This might have resulted in selection bias where more anxious and depressive persons with FMS are recruited. We endeavoured to check for such bias by recruiting another chronic pain control group. Exclusion criteria such as suicidal thoughts and use of psychotropic agents might have biased patient selection. It is also important to note that the BDI and BAI do not provide diagnostic information. Further to be noted is that ACR criteria allow classification and not diagnosis of FMS. In the same vein, diagnosis of a depressive disorder or an anxiety disorder requires a structured interview and a recognised nosological system. This is a limitation of our study that should be noted. Another limitation is the method of assessing pain. Methods measuring pressure pain and heat pain sensitivities have been shown to be more accurate measures of perceived pain than VAS. We stated previously that these data are only correlational and the process of somatisation is not directly measured. Finally, it should be borne in mind that chronic syndromes such as FMS, chronic fatigue syndrome and irritable bowel syndrome are still controversial diagnostic entities. They have recently been considered part of a larger group of somatoform disorders. Recent findings support the hypothesis of a central sensory or nociceptive processing disorder as the underlying mechanism for fibromyalgia syndrome [20]. Against all these caveats, we believe that our

study sheds some light on this much debated issue. Prospective studies are necessary to draw more definitive conclusions on the relationship between psychiatric distress and FMS.

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