



Original Article

# Alexithymia and attention deficit and their relationship with disease severity in fibromyalgia syndrome

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## ABSTRACT

**Objectives:** The aim of this study was to investigate the frequency of alexithymia and attention deficit and to evaluate their relationship with the severity of disease in patients with fibromyalgia syndrome (FMS).

**Patients and methods:** A total of 101 patients (6 males, 95 females; mean age 45.0 years; range, 33 to 56 years) who were admitted to Gaziantep University, Medical Faculty, Physical Medicine and Rehabilitation Department between January 2013 and December 2013 and were diagnosed with FMS and 40 healthy volunteers (4 males, 36 females; mean age 41.5 years; range, 31 to 51 years) were enrolled in this study. The Fibromyalgia Impact Questionnaire (FIQ), Hamilton Depression Scale (HAM-D), Toronto Alexithymia Scale-26 (TAS-26), and Jasper-Goldberg Attention Deficit Test (ADT) were applied.

**Results:** The rate of alexithymia and possible alexithymia was 56.4% and 20.8% in the patients with FMS and 2.5% and 5% in the control group, respectively. The mean TAS-26 score was 60.1±11.7 in the patients with FMS. According to the HAM-D, depressive symptoms were seen in 72.0% and 2.5% of the patients with FMS and healthy controls, respectively.

**Conclusion:** Our study results confirm the presence of psychiatric comorbidities in patients with FMS and clearly suggest that depression, alexithymia, and attention deficit are high and mutually correlated in FMS patients. Therefore, all patients should be meticulously evaluated for these conditions at the treatment stage.

**Keywords:** Alexithymia, attention deficit, depression, fibromyalgia syndrome.

Fibromyalgia syndrome (FMS) is a clinical condition accompanied by pathologies, such as depression, irritable bowel syndrome, sleeping disorder, memory problems, chronic widespread pain, and fatigue. Although the majority of patients complain of various somatic and muscle-joint problems, routine blood tests and radiological examinations are normal in most cases.<sup>[1]</sup>

Although its etiology still remains unknown, central pain syndrome associated with an increased sensitivity of the central nervous system to pain stimulus has been proposed.<sup>[2]</sup> Although the main finding in fibromyalgia is pain, the prevalence of emotional stress and diagnosis of psychiatric diseases are high among the overall population.<sup>[3]</sup> In recent years, some authors have recommended

the evaluation of these patients also in terms of personality characteristics, alexithymia, and the other accompanying psychiatric diseases within the framework of the biopsychosocial model.<sup>[4,5]</sup>

Alexithymia is the decrease in the ability to describe and express emotions.<sup>[6]</sup> It is believed to prevent the regulation of negative emotions, and individuals with alexithymia are thought to develop hypersensitivity to somatic emotions and perceive mild physical symptoms as intensely discomforting. Taylor et al.<sup>[7]</sup> found that alexithymic personality is common in patients with fibromyalgia. While the pathogenesis of fibromyalgia is still unclear, it is thought that neurotransmitters such as serotonin, noradrenaline, and dopamine play a key role in its etiology. It has been also suggested that dopamine

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receptor sensitivity increases in patients with fibromyalgia and dopaminergic agents can be used in the treatment. Another disease in which dopamine and noradrenaline neurotransmitter functions play a role in its etiology is attention deficit and hyperactivity disorder (ADHD).

In the present study, we aimed to investigate the frequency of alexithymia and attention deficit and to evaluate their relationship with the severity of disease in patients with FMS.

## PATIENTS AND METHODS

A total of 101 patients (6 males, 95 females; mean age 45.0 years; range, 33 to 56 years) who were admitted to Gaziantep University, Medical Faculty, Physical Medicine and Rehabilitation Department between January 2013 and December 2013 and were diagnosed with FMS according to the American College of Rheumatology<sup>[8]</sup> and 40 healthy volunteers (4 males, 36 females; mean age 41.5 years; range, 31 to 51 years) were enrolled in this study. The study group included patients who did not use any medication. In addition, those with a history of malignant disease, hyperthyroidism/hypothyroidism, chronic inflammatory disease, diabetes mellitus, and uncontrollable heart and kidney diseases and pregnant women were excluded. The detailed musculoskeletal system examination of the patients included in the study was carried out by a single physician, and whole blood count, C-reactive protein, erythrocyte sedimentation rate, and routine biochemistry tests were performed using the venous blood samples taken from the patient group. A written informed consent was obtained from each participant. The study protocol was approved by the Ethics Committee of Gaziantep University, Faculty of Medicine (22.01.2013/39). The study was conducted in accordance with the principles of the Declaration of Helsinki.

### Assessment tools

In the study, scales evaluating the presence of alexithymia, the functional condition associated with FMS, attention deficit, and depression were filled out with the sociodemographic form including demographic factors and medical data for the participants. The following assessments were performed:

*The Fibromyalgia Impact Questionnaire (FIQ):* This scale was first developed by Burchardt et al.<sup>[9]</sup> for the assessment of the functional condition in patients with FMS. Physical function assesses 10 different

characteristics including feeling good, missed work days, having difficulty at work, pain, fatigue, morning fatigue, dysfluency, anxiety, and depression. The maximum score that can be received under each of the 10 sub-titles is 10. Therefore, the total maximum score is 100. While an average patient with FMS scores 50 points, a patient who is affected severely usually scores 100.<sup>[10]</sup>

*The Hamilton Depression Scale (HAM-D):* This scale is commonly used in studies at the onset of depressive symptoms and for follow-up evaluations. The scale includes 17 items. The highest score is 53 points: 0-7 points (no depression), 8-15 points (mild depression), 16-28 points (moderate depression), and  $\geq 29$  points (severe depression).<sup>[11,12]</sup>

*The Toronto Alexithymia Scale (TAS-26):* This scale is a self-report measure consisting of 26 items and each item is evaluated on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate an increase in alexithymic tendency.<sup>[13,14]</sup>

*The Jasper-Goldberg Attention Deficit Test (ADT):* This test is used to assess the possibility of attention deficit. The test consists of 24 items, each item being responded to with a score between 0 to 5 points. Scores above 70 show the possibility of high attention deficit. It also provides information as to how an individual behaves and feels about certain events during his/her lifetime.<sup>[15]</sup>

### Statistical analysis

Statistical analysis was performed using the IBM SPSS version 22.0 software (IBM Corp., Armonk, NY, USA). Descriptive data were expressed in mean  $\pm$  standard deviation (SD) or number and frequency. The Shapiro-Wilk test was used to analyze the compliance of the digital data with normal distribution. The Student's t-test was used to compare normally distributed variables between the groups. The relationship between the categorical variables was examined using the chi-square test and the relationship between the numerical variables was examined using the Pearson correlation coefficient. The strength of the relationship was determined according to the correlation coefficient (r). A r value of 0 to 0.2 was considered very weak, 0.2 to 0.4 weak, 0.4 to 0.6 moderate-to-severe, 0.6 to 0.8 strong, and 0.8 to 1 very strong relationship.<sup>[16]</sup> A p value of  $<0.05$  was considered statistically significant.

Variable	Patient group (n=101)		Control group (n=40)		p
	Mean±SD		Mean±SD		
Age (year)	45.0±11.6		41.5±9.8		0.210
Diagnosis time (year)	6.3±5.9		0±0		-
Body mass index	28.7±5.4		27.3±5.2		0.167
Fibromyalgia Impact Questionnaire	64.1±11.0		8.2±9.3		0.001
Toronto Alexithymia Scale	60.1±11.7		39.7±7.6		0.001
Jasper-Goldberg Attention Deficit	64.3±20.1		11.5±11.9		0.001
Hamilton Depression Scale	12.3±6.1		0.8±2.9		0.001

SD: Standard deviation.

## RESULTS

There was no statistically significant difference between the patient and control groups in terms of age, gender, exercise, or education status ( $p>0.05$ ). The majority of the patients with FMS consisted of women (94.1%). The rate of education status (literacy or primary school 59%) and regular exercise were low (26.7%) in the patient group. However, no significant difference was observed compared to the control group.

The depression level, severity of FMS, and attention deficit scores were significantly higher in the patient group, compared to the control group ( $p<0.001$ ). Demographic and clinical characteristics of patients are shown in Table 1. Comparison of categorical variables between the groups is shown in Table 2.

Attention deficit was not observed in any of the healthy controls, while it was seen in 37.6% of the patients with FMS. According to the total alexithymia scores, the rate of alexithymia and possible alexithymia

was 56.4% and 20.8% in the patients with FMS and 2.5% and 5% in the control group, respectively. The mean TAS score was  $60.1\pm 11.7$  in the patients with FMS. According to the HAM-D, depressive symptoms were seen in 72.0% and 2.5% of the patients with FMS and healthy controls, respectively. The mean HAM-D score was  $12.3\pm 6.1$  in the patient group. There was a significant correlation between the diagnosis of alexithymia and possible alexithymia and attention deficit depressive disorder ( $p=0.001$ ). The ADT, HAM-D, and TAS scores of the groups are shown in Table 3.

In the FMS group, there was a positively weak correlation between the FIQ and TAS scores ( $r=0.330$ ,  $p=0.001$ ), a positively moderate correlation between the FIQ and ADT scores ( $r=0.422$ ,  $p=0.001$ ), and a positively weak correlation between the FIQ and HAM-D scores ( $r=0.234$ ,  $p=0.001$ ). A positively moderate correlation was also found between the TAS and ADT scores in the patient group ( $r=0.505$ ,  $p=0.001$ ) (Table 4).

	Patient group (n=101)		Control group (n=40)		p
	n	%	n	%	
Gender					0.412
Female	95	94.1	36	90.0	
Male	6	5.9	4	10.0	
Menopause					0.012*
Premenopausal	57	60.0	30	83.3	
Postmenopausal	38	40.0	6	16.7	
Exercise					0.493
Yes	27	26.7	13	32.5	
No	74	73.3	27	67.5	
Education level					0.067
Literacy + primary education	59	59.0	15	37.5	
Secondary education + high school	23	23.0	15	37.5	
University	18	18.0	10	25.0	

**TABLE 3**  
Jasper-Goldberg Attention Deficit Test, Hamilton Depression Scale, and Toronto Alexithymia Scale scores of patient and control groups

	Patient group		Control group		p
	n	%	n	%	
Jasper-Goldberg Attention Deficit Test groups					0.001
Normal	63	62.4%	40	100.0%	
Attention deficit	38	37.6%	0	0.0%	
Hamilton Depression Scale groups					0.001
Normal	28	28.0%	39	97.5%	
Depressed	72	72.0%	1	2.5%	
Toronto Alexithymia Scale group					0.001
Alexithymia	57	56.4%	1	2.5%	
Possible	21	20.8%	2	5.0%	
Normal	23	22.8%	37	92.5%	

**TABLE 4**  
Correlation analysis

Study group	Correlations			
	FIQ	TAS	ADT	HAM-D
Fibromyalgia Impact Questionnaire				
r	1	0.330	0.422	0.234
p		0.001	0.000	0.019
Toronto Alexithymia Scale				
r	0.330	1	0.505	0.113
p	0.001		0.000	0.263
Jasper-Goldberg Attention Deficit Test				
r	0.422	0.505	1	0.215
p	0.000	0.000		0.031
Hamilton Depression Scale				
r	0.234	0.113	0.215	1
p	0.019	0.263	0.031	

FIQ: Fibromyalgia Impact Questionnaire TAS: Toronto Alexithymia Scale ADT: Jasper-Goldberg Attention Deficit Test; HAM-D: Hamilton Depression Scale.

### DISCUSSION

In this study, we examined the correlation between the frequency of alexithymia and attention deficit and disease severity in patients with FMS. Our patient population mainly consisted of middle-aged women, consistent with the literature. The overall low education status among the patients is also consistent with the literature.<sup>[17-19]</sup> It is well-known that socio-cultural factors are important in the emergence of alexithymia.

Fibromyalgia syndrome is a disease presenting with intense subjective complaints associated with many clinical conditions which are characterized by chronic widespread pain. Many psychiatric problems, including anxiety disorder and depression, are often seen in patients with FMS. Alexithymia is considered one of the disorders related to cognitive dysfunction. The

main disorder in alexithymia is the lack of cognitive processing and regulation of emotions. Therefore, some of the emotional and behavioral disorders associated with fibromyalgia can be considered to express the presence of alexithymia.<sup>[20]</sup> Patients with alexithymia may tend to misinterpret their emotional conditions as the indicators of a physical disease.<sup>[21]</sup>

Alexithymia is reported to be associated with many painful conditions and psychiatric disorders, such as migraine, myofascial pain, and chronic regional pain syndrome.<sup>[7,22-26]</sup> In our study, the incidence of alexithymia was significantly higher in the FMS group, compared to the control group. There was also a positive correlation between the FIQ scores which show functional condition and quality of life in patients with FMS and the TAS scores indicating alexithymia tendency. This result was interpreted as the failure of individuals with alexithymia to sufficiently

define physical senses, and the fact that mild physical symptoms might turn into discomforting physical diseases. In individuals with alexithymia, it is thought that the increase in negative emotions, sympathetic overstimulation, and immunity dysregulation as a result of the regulation of negative feelings prevented may contribute to the development and exacerbation of somatic disease and pain.<sup>[27]</sup> Therefore, we believe that the presence of alexithymia in chronic pain conditions and patients with FMS may affect the treatment method.

Chronic pain is believed to consist of two major components: sensational and emotional. Alexithymia is associated with the emotional aspect of chronic pain rather than the sensational one, and increased depression is thought to mediate such relationship.<sup>[28]</sup> Various statements have been made supporting the fact that the emotional aspect of pain is dominant in fibromyalgia. Depression is the main predictor of the emotional aspect of pain. Depression has been widely studied in both the fields of chronic pain and alexithymia.<sup>[29]</sup> Chronic pain is often accompanied with depression, and alexithymia is mostly associated with depression and provides a tendency for it. Such observations give rise to the thought that depression may mediate the correlation between alexithymia and chronic pain.

Patients with FMS often suffer from cognitive problems such as attention and concentration deficit, and memory problems are seen at a much higher rate, compared to other rheumatic diseases.<sup>[30]</sup> In some cases, memory problems can be severe enough to affect work and social life. In a study by Leavitt and Katz,<sup>[31]</sup> they found that memory problems were at a much higher rate, compared to the control group, and the addition of a distracting source led to insufficient preservation of the information.

Additionally, FMS also involves a series of neurologic phenomena, such as unease and concentration disorder, which are frequently seen in adult patients with ADHD.<sup>[4]</sup> We also observed that attention deficit was at a higher rate in the patient group, compared to the control group. In addition, we found a moderate correlation between the increased attention deficit scores and the increased severity of disease.

To date, many studies have demonstrated that there is a positive correlation between ADHD and depression; however, the results are controversial. This can be attributed to the different parameters used.<sup>[32]</sup> In our study, we observed that the more the possibility

of attention deficit increased, the more the severity of depression increased in patients with FMS, supporting the above data.

Unfortunately, there is a limited number of studies in the literature regarding the correlation between attention deficit and alexithymia and the interaction between emotion processing.<sup>[33-35]</sup> Wender et al.<sup>[36]</sup> proposed four additional diagnosis criteria for ADHD for the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV): lack of organization, quick temper, affected mood shifts, and emotional overreactivity, three of which express emotional disorders. Non-functional emotional processing in adult ADHD could, at least, be a partial result of alexithymia.

Nonetheless, there are some limitations to this study. First, our sample size is small. The cross-sectional design of the study is another limitation. Therefore, more comprehensive follow-up studies with larger sample size for psychiatric comorbidities in FMS are required.

In conclusion, our study results confirm the presence of psychiatric comorbidities in patients with FMS and clearly suggest that depression, alexithymia, and attention deficit are high and mutually correlated in FMS patients. Therefore, we recommend that all patients should be meticulously evaluated for these conditions at the treatment stage.

#### **Declaration of conflicting interests**

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

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