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Research

The Relationship Between Cognitive Functions and Pain Intensity in Patients with Fibromyalgia

Fibromiyalji Hastalarında Kognitif Bozuklukların Ağrı Şiddeti ile İlişkisi

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ABSTRACT

Objective: This study aimed to determine the cognitive functions in patients with fibromyalgia and healthy control group and compare the relationship of cognitive dysfunction with pain severity.

Methods: This study evaluated the cognitive functions and pain severity of 93 patients and 93 healthy controls who were diagnosed with fibromyalgia in the physical medicine and rehabilitation clinic and referred to our outpatient psychiatry clinic for consultation. Sociodemographic data form, Montreal Cognitive Assessment (MOCA) scale for cognitive functions, Mini-Mental test, Hamilton Depression scale, and visual analogue scale (VAS) for pain severity were applied to the patients. Consent was obtained from the patient and the control groups.

Results: The total points of MOCA, attention, visuospatial, naming, language, abstraction, orientation, and delayed memory subscores of the fibromyalgia group were significantly lower than the healthy control group. This result revealed a significant level of mild deterioration in cognitive functions in the fibromyalgia group ($p<0.005$). Additionally, the VAS pain score was significantly higher in patients with fibromyalgia having cognitive impairment ($p<0.005$).

Conclusion: Pain and psychiatric symptoms are quite frequently seen in patients with fibromyalgia; however, they are accompanied by cognitive dysfunction. Dysfunction in attention, visualization, naming, language, abstraction, orientation, and delayed memory increase the severity of pain. Therefore, we think that it will also affect the functionality in the future. Additionally, cognitive dysfunction identification and cognitive-behavioral treatments should be added to the current fibromyalgia treatment.

Keywords: Cognitive functions, fibromyalgia, attention, pain intensity

ÖZ

Amaç: Amacımız fibromiyaljisi olan hastalarda ve sağlıklı kontrol grubunda bilişsel fonksiyonları tanımlamak ve bilişsel fonksiyonlardaki bozukluğun ağrı şiddeti ile olan ilişkisini incelemektir.

Gereç ve Yöntem: Fizik tedavi kliniğinde fibromiyalji tanısı konularak konsültasyon amacı ile ayaktan psikiyatri polikliniğimize gönderilen toplam 93 hasta ve 93 sağlıklı kontrol hastasının bilişsel fonksiyonları ve ağrı şiddetleri değerlendirildi. Bu amaçla hastalara sosyodemografik veri formu kognitif fonksiyonlar için Montreal Kognitif Değerlendirme (MOBİD) ölçeği, Mini-Mental test, Hamilton Depresyon ölçeği ve ağrı şiddeti için vizüel analog skala (VAS) uygulanmıştır. Hasta ve kontrol grubundan onam alınmıştır.

Bulgular: Fibromiyalji grubunun MOBİD toplam, dikkat, vizyospasiyal, adlandırma, dil, soyutlama, oryantasyon ve gecikmeli hafıza skorları sağlıklı kontrol grubuna göre anlamlı düzeyde daha düşük bulunmuştur. Bu sonuç fibromiyalji grubunda anlamlı düzeyde kognitif fonksiyonlarda hafif bozulma olduğunu göstermiştir ($p<0,005$). Ayrıca kognitif bozukluk saptanan fibromiyalji hastalarında VAS ağrı skorunda anlamlı oranda yüksek bulunmuştur ($p<0,005$).

Sonuç: Fibromiyaljili hastalarda ağrı ve psikiyatrik belirtiler oldukça sık oranda görülmekle beraber kognitif bozukluklarda eşlik etmektedir. Dikkat, vizyospasiyal, adlandırma, dil, soyutlama, oryantasyon ve gecikmeli hafıza alanındaki bozukluklar ağrı şiddetini artırmaktadır. Sonuç olarak olarak ileride işlevselliği de etkileyeceğini düşünmekteyiz. Bu sebeple kognitif bozuklukların belirlenmesi ve bilişsel davranışsal tedaviler fibromiyaljinin güncel tedavisine eklenmelidir.

Anahtar Kelimeler: Kognitif bozukluk, fibromiyalji, dikkat, ağrı yoğunluğu

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INTRODUCTION

Fibromyalgia syndrome is a chronic disease that is accompanied by many psychiatric symptoms, such as sleep disorder, cognitive dysfunction, and depression, as well as severe pain and fatigue (1). The population prevalence of fibromyalgia ranges from 2% to 8%, and the prevalence increases with increasing age. Studies revealed that female gender, socioeconomic status, and low educational level increase the risk of disease (2). It is common in women aged 40-60 years. Its etiology and pathogenesis are still unknown but are thought to be multifactorial. Neural activity changes in the central nervous system, abnormality of metabolism in some biogenic amines, and immunological events may lead to disease development. Fibromyalgia syndrome complaints are mostly subjective. Distinguishing the disease from psychosomatic diseases is difficult (3).

Fibromyalgia is defined as a disease, in which chronic widespread muscle pains that cannot be explained by another disease are accompanied by fatigue, sleep disturbance, and various somatic symptoms. Psychiatric disorders that occur in patients with fibromyalgia are among the factors that seriously affect the quality of life of the person. These patients have a high rate of lifelong psychiatric disorders and psychiatric disorders even before the disease onset (4). Psychiatric disorders often accompany fibromyalgia. The most common accompanying psychiatric disorder is depression, which is seen in approximately 20-80% of patients with fibromyalgia. This is followed by psychiatric disorders, such as anxiety, somatization, and obsessive-compulsive (4).

Two factors are considered in the development of high rates of depression in patients with fibromyalgia. Common genetic predispositions and triggering factors increase the risk of depression (5). Studies of patients with depression level and pain severity reported not only the common pathophysiological processes between pain and depression but also the low pain threshold, which is shaped by structure deformation, such as the amygdala and hippocampus, is important (6). Factors that increase the pain of people should be considered to understand the nature of depression that occurs in patients with fibromyalgia. One of them is cognitive processes. According to the latest obtained data, as the level of pain perceived by the person increases, the level of depression also increases. Based on this connection, the reason for intense negative orientation towards painful stimuli is cognitive distortions defined as catastrophizing (6).

In recent years, especially in developed countries, fibromyalgia has emerged as a serious functionality problem by reducing the workforce and quality of life. Cognitive dysfunction seen in fibromyalgia is now considered a separate clinical condition. Thus, cognitive dysfunctions can cause depression, anxiety, sleep disorders, and an increased pain level. Previous studies revealed an inverse relationship between obesity and cognitive dysfunction (7).

Despite all the obtained information, the treatment of choice for fibromyalgia was not achieved. Cognitive complaints are seen up to 95% in fibromyalgia; however, they are not adequately recognized by clinicians, and patients are left untreated. Subjective cognitive complaints are quite high in fibromyalgia patients, but the number of studies that use objective tests is very few. Therefore, this study aimed to examine the cognitive functions and the relationship between these functions and pain intensity in patients with fibromyalgia.

METHODS

This study evaluated the cognitive functions and pain severity of 93 patients and 93 healthy control who were diagnosed with fibromyalgia in the physical therapy clinic and referred to our outpatient psychiatry clinic for consultation. Sociodemographic data form, Montreal Cognitive Assessment (MOCA) scale for cognitive functions, Mini-Mental test (MMT), Hamilton Depression scale (HAM-D), and visual analogue scale (VAS) for pain severity were applied to patients and healthy control group. Consent was obtained from the patient and the control groups. Approval was obtained from the Clinical Research Ethics Committee of University of Health Sciences Turkey, Istanbul Training and Research Hospital for our study (decision no: 2936, date: 08.10.2021).

The sociodemographic data form included patients' gender, age, educational status, functionality, marital status, number of children, and duration of a fibromyalgia diagnosis.

VAS was used to measure the pain severity on the scale, which is prepared to convert some values that cannot be numerically measured. Patients are requested to mark the pain severity by showing a line with the words "0 (no pain)" at one end and "10 (severe pain)" at the other end (8).

The MMT is used to detect severe cognitive impairment and monitor treatment responses. The total score is calculated out of 30. The threshold value is accepted as 23/24 (23 and below points of cognitive dysfunction) (9).

The MOCA was developed to distinguish healthy individuals from those with mild cognitive impairment. It consists

of questions that assess attention and concentration, executive functions, memory, language, visuospatial skills, abstract thinking, calculation, and orientation. It can be applied in 10 minutes. The total score is calculated out of 30. The threshold value is 21 (20 and below points of cognitive dysfunction). Turkish validity and reliability study was made by Selekler et al. (10). The MOCA scale can detect cognitive impairment in milder stages, whereas the MMT is useful in more advanced stages (10).

Statistical Analysis

Statistical analyses were carried out using the Statistical Package for the Social Sciences version 17.0 program. The suitability of variables to the normal distribution was examined with histogram graphs and the Kolmogorov-Smirnov test. Average, standard deviation, and median values were used to present descriptive analyses. Categorical variables were compared with the Pearson Square test. The Mann-Whitney U test was used to evaluate nonparametric groups that did not show normal distribution. Spearman correlation test was used in the analysis of measuring data with each other. P-values of <0.05 were evaluated as statistically significant results.

RESULTS

A total of 186 people participated in the study, including 93 with fibromyalgia and 93 healthy controls. Of the participants, 64 (68.82%) were females and 29 (31.18%) were males; 32 (34.41%) are in primary education, 36 (38.71%) in high school, and 25 at university (26.88%); 58 (62.37%) are single and 8% (8.60%) are widows; 38 (40.86%) are working and 55 (59.14%) are not. The mean age of the participants was 38.33±8.23 years. The mean duration of fibromyalgia diagnosis of the fibromyalgia group is 3.40±1.71 years. No significant difference was found between the control group and the sociodemographic data of the fibromyalgia group (Table 1).

The mean MMT was 26.46±1.57 (median: 27.00) of the fibromyalgia group. According to this result, severe cognitive impairment was not detected in patients with fibromyalgia.

The average HAM-D results in the fibromyalgia group were 5.15±1.02 (median: 5.00), whereas 5.10±0.72 (median: 5.00) in the healthy control group (p=0.201). Thus, depression was not detected in both groups.

The total MOCA, attention, visuospatial, naming, language, abstraction, orientation, and delayed memory scores of the fibromyalgia and control groups were compared. MOCA total, attention, visuospatial, naming, language, abstraction, orientation, and delayed week scores of the control group were significantly higher than the fibromyalgia group. This result showed significant mild cognitive impairment in the fibromyalgia group (p<0.005) (Table 2).

For the cognitive impairment status in the fibromyalgia group, the MOCA scale and VAS scores were compared, which revealed significance (p<0.005). This result revealed that pain score was significantly higher in patients with fibromyalgia with cognitive impairment (Table 3).

DISCUSSION

This study aimed to evaluate the cognitive functions in patients with fibromyalgia without depression and the relationship between pain severity and mild cognitive impairment. Our study used the MOCA scales for cognitive functions, which revealed a statistically significant cognitive impairment compared to the healthy controls. The decreased visuospatial area, attention, naming, language orientation, and delayed memory areas were statistically significant, but the decreased abstraction area was not statistically significant. Pain intensity was also significantly higher in the group with mild cognitive retardation. This result shows that mild cognitive impairment in fibromyalgia causes pain to be felt more severely.

Fibromyalgia syndrome is a long-term syndrome that is characterized by pain, severe fatigue, sleep disturbances, and cognitive and emotional disturbances. The main symptom of fibromyalgia includes chronic and widespread pain accompanied by light sensitivity, as well as secondary complaints, such as decreased concentration and memory (11). Most reported is mild cognitive impairment. Especially in patients with occupations that require high concentration, cognitive impairments are likely to affect their performance. This condition is often included under the terms "cognitive dysfunction" and "fibrofog" in the medical literature and is being diagnosed with increasing frequency (12).

Cognitive problems are frequently encountered in studies that conducted objective tests (conceptual memory, daily attention, and selective attention) in patients with fibromyalgia. These patients experience serious memory problems in complex and demanding tasks (13). Studies revealed that cognitive impairment is experienced by 95% of patients with fibromyalgia (14). Further, depression is a disease that causes cognitive impairment. Thus, patients with fibromyalgia with depression were excluded from our study, as well as cognitive impairment due to depression.

Table 1. Sociodemographic variables

		Fibromyalgia		Controls		p-value
		n	%	n	%	
Sex	Female	64	(68.82)	60	(66.66)	0.250
	Male	29	(31.18)	33	(36.66)	
Education	Primary school	32	(34.41)	34	(36.56)	0.580
	High school	36	(38.71)	40	(43.01)	
	University	25	(26.88)	19	(20.43)	
Marital status	Married	58	(62.37)	41	(44.09)	0.036
	Single	27	(29.03)	43	(46.24)	
	Divorced	8	(8.60)	9	(9.68)	
Occupation	Worked	38	(40.86)	46	(49.46)	0.239
	No work	55	(59.14)	47	(50.54)	
Age		38.33±8.23		40.33±8.43		
Ki-kare test	-	-	-	-	-	-

Table 2. MOCA scores in the fibromyalgia and control groups

	Fibromyalgia			Controls			p-value
	Average	SD	Median	Average	SD	Median	
MOCA total	19.45	±1.91	19.00	27.08	±2.14	27.00	<0.001
Attention	3.84	±1.35	4.00	5.37	±0.67	5.00	<0.001
Visuospatial	4.18	±0.61	4.00	4.82	±0.44	5.00	<0.001
Naming	1.86	±0.62	2.00	2.65	±0.50	3.00	<0.001
Language	1.73	±0.51	2.00	2.52	±0.54	3.00	<0.001
Abstrational	1.26	±0.44	1.00	1.45	±0.50	1.00	0.006
Orientation	3.38	±1.20	4.00	5.45	±0.76	6.00	<0.001
Delayed recall	3.06	±1.25	3.00	4.81	±0.40	5.00	<0.001
Mann-Whitney U test							

SD: Standard deviation, MOCA: Montreal Cognitive Assessment

Table 3. The relationship between cognitive dysfunctions and pain scales

Fibromyalgia groups	Cognitive dysfunctions (MOCA scores 20 and below points)						p-value
	No			Yes			
	Average	SD	Median	Average	SD	Median	
VAS scale	4.04	±0.81	4.00	9.78	±0.94	9.00	<0.001
Mann-Whitney U test	-	-	-	-	-	-	-

SD: Standard deviation, MOCA: Montreal Cognitive Assessment, VAS: Visual analogue scale

Cognitive dysfunction is thought to be associated with an increased intensity of fibromyalgia symptoms, mental health deterioration, and reluctance (15). Making the differential diagnosis of cognitive dysfunction from real brain damage, such as organic origin, is necessary for patients with fibromyalgia.

Todd has argued that pain in patients with fibromyalgia may be related to patient phobias. The response to the onset or increased intensity of pain and the weak effort on neuropsychological tasks translates into a concept they call "overthinking and causing pain." This theory is called

"kinesophobia," this results in patients with pain being overly anxious about re-experiencing or exacerbating the pain and avoiding physical activities. Thus, the concept of cognitive phobia has received little attention but is a topic that will take place in future studies, which more likely supports this hypothesis (16,17).

CONCLUSION

Fibromyalgia is one of the most important health problems in developed countries, especially in recent years, which causes serious loss of workforce and a decreased quality of life. In these patients, difficulty in performing daily activities, widespread musculoskeletal pain, stiffness, and other symptoms, such as fatigue, sleep disorders, cognitive dysfunction, and mood disorders, are frequently encountered. Cognitive complaints are seen in functions, such as tasks that require attention, short-term memory, and decision-making functions, which are often neglected by clinicians. Standardized tests are insufficient to diagnose the cognitive dysfunction and determine the treatment strategy, thus most patients remain untreated.

Our study recommends including cognitive-behavioral treatments in addition to pharmacological treatment. The concept of kinesophobia will take place more in future studies. There, the functionality of patients will increase due to a multidisciplinary approach.

ETHICS

Ethics Committee Approval: Approval was obtained from the Clinical Research Ethics Committee of University of Health Sciences Turkey, Istanbul Training and Research Hospital for our study (decision no: 2936, date: 08.10.2021).

Informed Consent: Consent was obtained from the patient and the control groups.

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REFERENCES

1. Bennett RM, Jones J, Turk DC, Russell IJ, Matallana L. An internet survey of 2,596 people with fibromyalgia. BMC Musculoskelet Disord 2007;8:27.
2. Wolfe F, Ross K, Anderson J, Russell IJ, Hebert L. The prevalence and characteristics of fibromyalgia in the general population. Arthritis Rheum 1995;38:19-28.
3. Branco JC, Bannwarth B, Failde I, Abello Carbonell J, Blotman F, et al. Prevalence of fibromyalgia: a survey in five European countries. Semin Arthritis Rheum 2010;39:448-53.
4. Hudson JI, Goldenberg DL, Pope HG Jr, Keck PE Jr, Schlesinger L. Comorbidity of fibromyalgia with medical and psychiatric disorders. Am J Med 1992;92:363-7.
5. Gracely RH, Ceko M, Bushnell MC. Fibromyalgia and depression. Pain Res Treat 2012;2012:486590.
6. Nazlıgül MD, Bozo Ö. Fibromyalgia and depression within the framework of the biopsychosocial model. Turkish Psychology Articles 2017;20:73-5.
7. Miller MD, Ferris DG. Measurement of subjective phenomena in primary care research: the Visual Analogue Scale. Fam Pract Res J 1993;13:15-24.
8. Wewers ME, Lowe NK. A critical review of visual analogue scales in the measurement of clinical phenomena. Res Nurs Health 1990;13:227-36.
9. Güngen C, Ertan T, Eker E, Yaşar R, Engin F. Standardize Mini Mental test'in türk toplumunda hafif demans tanisinda geçerlik ve güvenilirliği [Reliability and validity of the standardized Mini Mental State Examination in the diagnosis of mild dementia in Turkish population]. Turk Psikiyatri Derg 2002;13:273-81.
10. Selekler K, Cangöz B, Uluc S. Power of discrimination of Montreal Cognitive Assessment (MOCA) scale in Turkish patients with mild cognitive impairement and alzheimer's disease. Turkish Journal of Geriatrics 2010;13:166-71.
11. Schmidt-Wilcke T, Wood P, Lürding R. Schmerz und Aufmerksamkeit. Kognitive Defizite bei Fibromyalgiepatienten [Cognitive impairment in patients suffering from fibromyalgia. An underestimated problem]. Schmerz 2010;24:46-53.
12. Glass JM. Fibromyalgia and cognition. J Clin Psychiatry 2008;69 Suppl 2:20-4.
13. Mease P. Fibromyalgia syndrome: review of clinical presentation, pathogenesis, outcome measures, and treatment. J Rheumatol Suppl 2005;75:6-21.
14. Dick BD, Verrier MJ, Harker TK, Rashiq S. Disruption of cognitive function in fibromyalgia syndrome. Pain 2008;139:610-6.
15. Leavitt F, Katz RS, Mills M, Heard AR. Cognitive and dissociative manifestations in fibromyalgia. J Clin Rheumatol 2002;8:77-84.
16. Todd DD, Martelli MF, Grayson RL. The Cogniphobia Scale (C-Scale): A measure of headache impact. Test in the public domain.
17. Todd DD. Kinesiophobia: the relationship between chronic pain and fear-induced disability. Forensic Exam 1998;7:14-20.