

## Type D Personality is Associated With Disease Severity and Poor Quality of Life in Turkish Patients With Fibromyalgia Syndrome: A Cross-Sectional Study

Yeşim GARİP<sup>1</sup>, Tuba GÜLER<sup>2</sup>, Özgül BOZKURT TUNCER<sup>3</sup>, Sinay ÖNEN<sup>4</sup>

<sup>1</sup>Department of Physical Medicine and Rehabilitation, Ankara Numune Training and Research Hospital, Ankara, Turkey

<sup>2</sup>Department of Physical Medicine and Rehabilitation, Derince Training and Research Hospital, Kocaeli, Turkey

<sup>3</sup>Department of Physical Medicine and Rehabilitation, Medipol University Medical School, Istanbul, Turkey

<sup>4</sup>Department of Psychiatry, Şevket Yılmaz Training and Research Hospital, Bursa, Turkey

### ABSTRACT

**Objectives:** This study aims to investigate the rate of type D personality in Turkish patients with fibromyalgia (FM) and evaluate its associations with clinical parameters of FM as well as its effects on health-related quality of life (HRQoL).

**Patients and methods:** The study included 100 patients with FM (14 males, 86 females; mean age 34.6±7.4 years; range, 22 to 49 years) fulfilling 1990 American College of Rheumatology diagnostic criteria and 50 healthy controls (9 males, 41 females; mean age 32.6±6.5 years; range, 21 to 50 years). Type D personality was assessed using the type D scale-14 (DS-14). FM disease severity was determined by Fibromyalgia Impact Questionnaire (FIQ), functional status by Stanford Health Assessment Questionnaire (HAQ), and HRQoL by Nottingham Health Profile (NHP). Severity of pain and fatigue were measured by visual analog scale (VAS).

**Results:** The frequency of type D personality was 33% in FM patients and 12% in controls (odds ratio=3.612, 95% confidence interval 1.398-9.333) (p=0.006). Type D FM patients scored higher in tender point count (TPC), FIQ, HAQ, VAS-pain and all NHP subgroups except energy (p<0.01). Type D personality was found to be correlated with FIQ, TPC, HAQ, VAS-pain and NHP subgroups except energy (p<0.01).

**Conclusion:** Based on our findings, assessment of personality characteristics of patients with FM may hold the key for the treatment of the disease. Besides, a better understanding of personality-related pain in FM patients may provide a more targeted approach to pain treatment.

**Keywords:** Fibromyalgia, pain, personality, quality of life.

Fibromyalgia (FM) is a common disorder characterized by unexplained widespread pain associated with 'tender points' which tend to be painful to touch.<sup>1</sup> Its pathogenesis has been thought as an altered processing of pain arising from neuroendocrine, neurotransmitter and sleep perturbation.<sup>2,3</sup> Although the main symptom of FM is pain, patients may also experience additional symptoms such as fatigue, depression, sleep disorders, stiffness, headache,

dizziness, muscle spasms and paresthesia.<sup>4,5</sup> In epidemiological studies, the prevalence of FM in general population was reported to range from 7.3 to 12.9%.<sup>6</sup> In previous researches, it has been found to be linked with various psychiatric disorders including depression,<sup>7,8</sup> anxiety,<sup>9,10</sup> post-traumatic stress disorder,<sup>11</sup> alexithymia,<sup>12,13</sup> panic disorder,<sup>14</sup> migraine,<sup>15,16</sup> restless leg syndrome<sup>17</sup> and irritable bowel syndrome.<sup>18</sup> Furthermore, psychological symptoms were

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**Correspondence:** Yeşim Garip, MD. Ankara Numune Eğitim ve Araştırma Hastanesi Fiziksel Tıp ve Rehabilitasyon Kliniği, 06230 Altındağ, Ankara, Turkey.  
Tel: +90 312 - 269 17 17 e-mail: dryesimgarip@gmail.com

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found to be associated with disease severity, poor physical fitness and deterioration in quality of life (QoL) in the patients with FM.<sup>19</sup>

Type D personality is a distressed personality type involving two personality traits, namely negative affectivity and social inhibition, which are described as tendency to experience negative emotions and to inhibit self-expression in social relationships, respectively.<sup>20</sup> Individuals with negative affectivity commonly concentrate on negative aspects of life and are likely to experience negative feelings such as distress, dissatisfaction, irritability, anxiety and depression.<sup>21</sup> Socially inhibited individuals tend to feel unsafe and vulnerable in social interactions. The prevalence of type D personality is 21% in the general population and increases in cardiovascular diseases such as coronary heart disease and hypertension.<sup>22</sup> In previous studies, type D personality was reported to be associated with poor clinical outcomes in ischemic heart disease,<sup>23</sup> cardiac arrhythmias,<sup>24</sup> and peripheral arterial disease.<sup>25</sup> Although there are sufficient numbers of studies focusing on the relationship between type D personality and cardiovascular diseases; few data are available on the role of type D personality on FM.

We hypothesized that FM might be associated with type D personality. We aimed to investigate the rate of type D personality in Turkish patients with FM and evaluate its associations with clinical parameters of FM as well as its effects on health-related quality of life (HRQoL).

## PATIENTS AND METHODS

The study included 100 patients with FM (14 males, 86 females; mean age  $34.6 \pm 7.4$  years; range, 22 to 49 years) applying to physical medicine and rehabilitation clinics of Derince Training and Research Hospital and Medipol University Esenler Hospital, between December 2015 and May 2016. FM was diagnosed based on 1990 American College of Rheumatology diagnostic criteria:<sup>26</sup> (i) chronic pain which occurs on both sides of the body, both axial and peripheral, below and above the waist; (ii) minimum 11 of 18 tender points with digital palpation with an approximate

force of 4 kg/cm<sup>2</sup>. Tender point count (TPC) was measured by the same physician. Control group included 50 age and sex-matched healthy subjects (9 males, 41 females; mean age  $32.6 \pm 6.5$  years; range, 21 to 50 years). Exclusion criteria for both patients and controls were inflammatory rheumatic diseases such as rheumatoid arthritis, ankylosing spondylitis, Sjögren's syndrome; endocrine diseases such as diabetes mellitus, thyroid and parathyroid disorders, and malignancies. Disease severity was determined by Fibromyalgia Impact Questionnaire (FIQ).<sup>27</sup> Functional status was evaluated by Stanford Health Assessment Questionnaire (HAQ),<sup>28</sup> and HRQoL by Nottingham Health Profile (NHP).<sup>29</sup> Severity of pain and fatigue was measured by using 10-cm visual analog scale (VAS).<sup>30</sup>

Type D personality was assessed by a psychiatrist using the Turkish version of type D scale-14 (DS-14).<sup>31</sup> DS-14 (Figure 1) was developed in 2005 by Denollet<sup>22</sup> as a measure of negative affectivity and social inhibition in order to be used in epidemiologic and clinical studies. It includes two subscales which assess negative affectivity and social inhibition. Each subscale consists of seven items and each item is scored between 0 and 4. Scores  $\geq 10$  in negative affectivity and social inhibition subscales indicate type D personality. FM patients were divided into two groups as type D and non-type D patients.

The study protocol was approved by the Kocaeli University Medical School Ethics Committee. A written informed consent was obtained from each participant. The study was conducted in accordance with the principles of the Declaration of Helsinki.

### Statistical analysis

Statistical analyses were carried out using IBM SPSS for Windows, version 21.0 (IBM Inc., Armonk, NY, USA). Descriptive statistics (mean, median, standard deviation, minimum, maximum and frequencies) were used for assessing the demographics and clinical parameters. Differences among groups were evaluated by using independent samples t-test. Chi-square test was used to compare groups of categorical variables. The presence of correlation was determined by Pearson's correlation

Below are a number of statements that people often use to describe themselves. Please read each statement and then circle the appropriate number next to the statement to indicate your answer. There are no right and wrong answers. Your own impression is the only thing that matters.		
0: False 1: Rather false 2: Neutral 3: Rather true 4: True		
1	I make contact easily when I meet people	01234
2	I often make a fuss about unimportant things	01234
3	I often talk to strangers	01234
4	I often feel unhappy	01234
5	I am often irritated	01234
6	I often feel inhibited in social interactions	01234
7	I take a gloomy view of things	01234
8	I find it hard to start a conversation	01234
9	I am often in a bad mood	01234
10	I am a closed kind of person	01234
11	I would rather keep other people at a distance	01234
12	I often find myself worrying about something	01234
13	I am often down in the dumps	01234
14	When socializing, I don't find the right things to talk about	01234

**Figure 1.** Type D Scale-14 (DS-14).

coefficient. P values  $<0.01$  were considered statistically significant.

## RESULTS

Age did not significantly differ between FM patients and healthy controls ( $p=0.096$ ). Demographic and clinical patient data are given in Table 1. According to DS-14, the frequency of type D personality was 33% in FM patients and 12% in healthy controls (odds ratio=3.612, 95% confidence interval 1.398-9.333) ( $p=0.006$ ) (Table 2).

A comparison of type D ( $n=33$ ) and non-type D FM patients ( $n=67$ ) showed that type D FM patients scored significantly higher in TPC, FIQ, HAQ, VAS-pain, and all NHP subgroups except energy ( $p<0.01$ ). There was no statistically significant difference in VAS-fatigue among groups ( $p>0.01$ ) (Table 3).

Negative affectivity and social inhibition were found to be significantly correlated with TPC, FIQ, HAQ, VAS-pain and all NHP subgroups except energy ( $p<0.01$ ). When the correlation coefficients were analyzed, both negative

affectivity and social inhibition showed the highest correlation with VAS-pain. There was no statistically significant correlation between negative affectivity and social inhibition and VAS-fatigue ( $p>0.01$ ) (Table 4).

**Table 1.** Demographic and clinical patient data

	Mean $\pm$ SD	Min-Max
Age (year)	34.6 $\pm$ 7.4	22-49
Pain (VAS, 10 cm)	6.7 $\pm$ 1.7	4-10
Fatigue (VAS, 10 cm)	4.2 $\pm$ 3.4	0-10
Tender point count	13.8 $\pm$ 2.4	11-18
FIQ	71.4 $\pm$ 14.9	43-100
HAQ	0.8 $\pm$ 0.7	0-3
NHP-pain	72.5 $\pm$ 17.5	25-100
NHP-physical mobility	32.8 $\pm$ 24.5	0-75
NHP-energy	40.0 $\pm$ 41.4	0-100
NHP-sleep	64.1 $\pm$ 24.2	0-100
NHP-social isolation	30.4 $\pm$ 36.3	0-100
NHP-emotional reactions	61.9 $\pm$ 27.2	0-100

SD: Standard deviation; Min: Minimum; Max: Maximum; VAS: Visual analog scale; FIQ: Fibromyalgia Impact Questionnaire; HAQ: Stanford Health Assessment Questionnaire; NHP: Nottingham Health Profile.

**Table 2.** Prevalence of type D personality in fibromyalgia patients and controls

	n	%	Difference	95% CI	p
Fibromyalgia patients (n=100)	33	33			
Healthy controls (n=50)	6	12	3.612	1.4-9.3	0.006*

CI: Confidence interval; \* p<0.01 was considered statistically significant.

**Table 3.** Comparison of clinical variables and HRQoL between type D and non-type D fibromyalgia patients

	Type D FM patients (n=33)	Non-type D FM patients (n=67)	p
	Mean±SD	Mean±SD	
Pain (VAS, 10 cm)	8.6±0.8	5.8±1.2	<0.00001*
Fatigue (VAS, 10 cm)	4.5±3.2	4.0±3.5	0.6
Tender point count	15.7±2.3	12.9±1.9	<0.00001*
Fibromyalgia impact questionnaire	86.3±8.4	64.1±11.4	<0.00001*
Stanford health assessment questionnaire	1.2±0.8	0.5±0.5	<0.00001*
NHP-pain	89.2±10.7	64.3±14.1	<0.00001*
NHP-physical mobility	53.4±16.9	22.6±21.0	<0.00001*
NHP-energy	45.5±42.1	37.3±41.1	0.358
NHP-sleep	80.0±19.4	56.2±22.6	<0.00001*
NHP-social isolation	60.6±37.2	15.5±25.1	<0.00001*
NHP-emotional reactions	83.7±14.1	51.5±25.1	<0.00001*

HRQoL: Health-related quality of life; FM: Fibromyalgia; SD: Standard deviation; VAS: Visual analog scale; NHP: Nottingham Health Profile; \* p<0.01 was considered statistically significant.

**Table 4.** Correlation of type DS-14 components with clinical parameters and HRQoL

		Negative affectivity	Social inhibition
		r	0.801
Pain (VAS, 10 cm)	p	<0.00001*	<0.00001*
	r	0.138	0.071
Fatigue (VAS, 10 cm)	p	0.170	0.483
	r	0.624	0.555
Tender point count	p	<0.00001*	<0.00001*
	r	0.758	0.703
Fibromyalgia impact questionnaire	p	<0.00001*	<0.00001*
	r	0.615	<0.00001*
Stanford health assessment questionnaire	p	0.626	<0.00001*
	r	0.691	0.676
NHP-pain	p	<0.00001*	<0.00001*
	r	0.667	0.554
NHP-physical mobility	p	<0.00001*	<0.00001*
	r	0.151	0.128
NHP-energy	p	0.135	0.205
	r	0.470	0.494
NHP-sleep	p	<0.00001*	<0.00001*
	r	0.533	0.692
NHP-social isolation	p	<0.00001*	<0.00001*
	r	0.684	0.568
NHP-emotional reactions	p	<0.00001*	<0.00001*

DS-14: Type D scale-14; HRQoL: Health-related quality of life; VAS: Visual analog scale; NHP: Nottingham Health Profile; \* p<0.01 was considered statistically significant.

## DISCUSSION

Type D personality is based on two stable personality traits: negative affectivity and social inhibition.<sup>20</sup> Previous studies have suggested that patients with FM have negative affectivity<sup>32</sup> and poor social QoL.<sup>33</sup> However, to our knowledge, there are only two studies in the literature examining the frequency of type D personality in patients with FM. In a 559-case cross-sectional study from Netherlands, the prevalence of type D personality in patients with FM was reported to be 56%.<sup>34</sup> In another study performed in Israel, 30% of FM patients were found to have type D personality.<sup>35</sup> In the present study, 33% of FM patients were found to have Type D personality; this rate was significantly higher than that of healthy controls (12%). In previous studies, the frequency of type D personality construct in Turkey was described as follows: 27.7% in hemodialysis patients<sup>31</sup> and 56.8% in patients with multiple sclerosis.<sup>36</sup> Our study has demonstrated that type D personality trait is common among Turkish patients with FM. To the best of our knowledge, this is the first study to report the rate of type D personality in Turkish FM patients.

In our study, type D FM patients showed poorer HRQoL in terms of pain, physical mobility, sleep, and social and emotional functions and more impairment in functional status compared to non-type D FM patients. Moreover, negative affectivity and social inhibition were found to be correlated with HAQ and all HRQoL domains except energy in FM patients. Similarly, in a study of van Middendorp et al.,<sup>34</sup> type D personality was reported to be associated with worse mental health and poor QoL regarding social and emotional functioning. Additional studies have also confirmed the negative impact of type D personality on HRQoL in other diseases. In a study of Mols and Denollet<sup>37</sup> conducted on patients with chronic pain, chronic lung diseases, sleep disorders, traumatic brain injury, vertigo, melanoma and diabetic ulcers, a significant relationship was found between type D personality and poor physical and mental health status. Moreover, Schiffer et al.<sup>38</sup> conducted a prospective study on patients with chronic heart failure to investigate the impact of type D personality and its stability over time on

health status. They found more improvement in health status over time in non-type D patients as compared to type D patients. On the other hand, Erkol Inal et al.<sup>39</sup> reported an association between type D personality trait and mental domains of HRQoL in Turkish patients with ankylosing spondylitis.

In the present study, FM patients with this type of personality showed higher disease severity compared to non-type D subjects. Moreover, negative affectivity and social inhibition were found to be correlated with FIQ and TPC levels. To the best of our knowledge, this study is the first to demonstrate an association between type D personality and disease severity in the patients with FM. Possible mechanisms that may explain poor clinical outcomes in type D FM patients include dysregulation of hypothalamic-pituitary-adrenal axis,<sup>40</sup> tumor necrosis factor-alpha (TNF- $\alpha$ ) dysregulation<sup>41</sup> and increased oxidative stress in cardiac diseases.<sup>23</sup> Since elevated levels of TNF- $\alpha$ ,<sup>42</sup> hypothalamic-pituitary-adrenal axis disturbances,<sup>43</sup> and oxidative stress<sup>44</sup> also play a role in the onset and continuation of FM; these pathways may also explain the relationship between type D personality and disease severity in the patients with FM. Besides, non-adherence to medication and reluctance to contact a healthcare provider may be additional factors in this relation.<sup>40</sup>

In the current study, VAS-pain scores of FM patients with type D personality were higher than those of non-type D patients. Additionally, negative affectivity and social inhibition showed the strongest correlation with pain severity among clinical parameters. The relationship between negative affectivity and pain is explained by psychological aspects of pain perception.<sup>45</sup> Emotional factors modulate pain perception via various pathways including projections from the midbrain periaqueductal grey to brainstem nuclei, including the rostroventral medulla and locus coeruleus, to the dorsal horn of the spinal cord. These tracts comprehend opioids, norepinephrine and serotonin, and have inhibitory and excitatory effects on medulla spinalis afferent projection neurons. Outputs from anterior cingulate cortex, prefrontal cortex, and amygdala reach periaqueductal grey, indicating that these descending systems might be stimulated by emotional factors.<sup>45</sup> Further studies conducted

on patients with other chronic pain syndromes are required to elucidate the relationship between type D personality and pain.

We found no difference in VAS-fatigue and NHP-energy scores of type D and non-type D patients with FM. Also, no significant correlation existed between VAS-fatigue and negative affectivity or social inhibition. These findings indicate that type D personality components, namely negative affectivity and social inhibition, are mainly linked with pain, but not fatigue symptoms in patients with FM.

This study has two limitations. First is the relatively small study sample, while second is the cross sectional design of the study which is inadequate to reflect the changes in parameters and to detect cause-and-effect relationships.

In conclusion, type D personality is prevalent among Turkish patients with FM, with a rate of 33%. It is associated with poor HRQoL regarding pain, physical mobility, sleep, and social and emotional functions. Presence of type D personality should be taken into account in FM to develop new treatment strategies for patients who have inadequate response to conventional therapies. In case of type D personality in a FM patient, we should be in collaboration with a psychiatrist. Besides medical therapy, group therapies including both cognitive-behavioral approaches and exercises may be considered in this process.

#### 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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