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Original article

## Comparison of the Big Five personality traits in fibromyalgia and other rheumatic diseases



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### ABSTRACT

**Introduction:** The personality of patients with fibromyalgia is still under debate. Some studies found high neuroticism associated with low extraversion, while others found that these traits do not differ from the normal population. Personality factors intervene in the emotional regulation and modulation of pain. The aim of the study was to determine the personality traits of patients with fibromyalgia compared to other rheumatic diseases.

**Methods:** In a multicentric study, women with fibromyalgia, rheumatoid arthritis, spondyloarthritis or Sjögren's syndrome were asked to complete the Big Five Inventory, which encompasses five main personality dimensions, namely (1) extraversion vs. introversion, (2) agreeableness vs. antagonism, (3) conscientiousness vs. impulsivity, (4) neuroticism vs. emotional stability, and (5) openness vs. closed-mindedness. Variance analysis (Student's *t*-test and ANOVA with post-hoc comparisons or Bonferroni correction) was performed. We also conducted hierarchical and non-hierarchical cluster analyses.

**Results and discussion:** Participants were 163 women with fibromyalgia ( $n=48$ ), rheumatoid arthritis ( $n=46$ ), spondyloarthritis ( $n=46$ ) and Sjögren's syndrome ( $n=23$ ). The mean age was 47.18 years ( $\pm 10.81$  years, range 21 to 65). Patients with fibromyalgia had higher scores on agreeableness ( $F(3, 159)=3.39, P<0.05$ ), neuroticism ( $F(3, 159)=3.79, P<0.05$ ) and openness ( $F(3, 159)=4.32, P<0.01$ ) than those with other rheumatic diseases. This study highlights the specificity of personality in fibromyalgia. It also underlines the protective role of personality traits: in the fibromyalgia group, high neuroticism and low conscientiousness (high impulsivity) were associated with a high level of chronic pain.

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### 1. Introduction

Fibromyalgia (FM), as defined by the 1990 classification criteria of the American College of Rheumatology, has been considered to be a rheumatic disease by the World Health Organization since 2007 [1]. It is a complex disorder characterized by widespread musculoskeletal pain and tenderness, without underlying objective lesion [2]. There are arguments for an interaction between genetic

heritability and comorbidities (trauma, post-traumatic stress disorder, mood disorder, personality disorders, etc.) [3]. In France and worldwide, FM affects 1.5 to 2.5% of the population with a sex ratio of 7 women to 1 man [4]. The condition is often associated with symptoms, such as fatigue and sleep disorders, anxiety and depression [4–7]. The quality of life of patients with FM is more impaired than in other chronic diseases [5]. Personality plays a major role in our perception of the environment and events, including the subjective experience of pain. According to Bond [6], personality plays an essential role in the nature, severity and extent of psychological disorders.

The personality of FM patients is still under debate. Some studies have found specific traits [7], others say that these traits do not differ from the normal population [8]. Several authors

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consider that FM is primarily characterized by an emotional regulation deficit (central sensitization concept) rather than differences in personality traits [3,9]. Emotional dysregulation or self-regulation deficit could explain why the personality of FM patients has historically been perceived as close to Cluster B personality disorders (PDs) (dramatic, impulsive and emotional), principally borderline or histrionic PD. While FM patients show a high level of psychopathology and childhood trauma, as in borderline personality disorder (BPD) [10], the prevalence of BPD in FM patients has not been established. Sansone et al. [11] found that the prevalence of BPD among primary care patients with chronic pain can be high (nearly 50% in a small group), suggesting that this would also be the case in FM. However, Thieme et al. and Uguz et al. found 5% and 1% of BPD among FM patients, respectively [12,13]. Histrionic PD has been reported in 1% of FM patients [13]. High prevalence rates of anxious PDs have also been found compared to a control group: obsessive-compulsive (23% vs. 4%), specific phobia (14% vs. 5%) and avoidant (11% vs. 2%).

The personality of FM patients has been widely investigated using the Minnesota Multiphasic Personality Inventory (MMPI), revealing people who are emotional, irritable, hypochondriac, dependent and perfectionist. The personality of patients with FM is more pathological than that of patients with rheumatoid arthritis (RA) and healthy controls [8,14,15]. Other studies have evaluated the personality of FM patients using the Temperament and Character Inventory (TCI), revealing high scores on Self-Transcendence and Harm Avoidance and low scores on Self-Directedness [16,17]. These results indicate impaired functioning, depression, and anxiety symptoms in patients with FM.

In the present study, we investigated the personality of patients with FM using the five-factor model (FFM) which encompasses the five main dimensions (Big Five) of personality, broadly defined as (1) extraversion vs. introversion, (2) agreeableness vs. antagonism, (3) conscientiousness or control vs. impulsivity, (4) neuroticism vs. emotional stability, and (5) openness to new experience/intellect vs. closed-mindedness [18]. Previous studies have found high levels of neuroticism [19,20]. A combination of high neuroticism and low extraversion indicates serious psychosocial problems [21]. The aim of this study was to compare the Big Five personality traits of patients with FM and other rheumatic diseases using the FFM.

## 2. Methods

### 2.1. Participants and procedure

The inclusion criteria were:

- women aged over 18 and under 70 years;
- duration of disorder from 6 months to 10 years;
- social security cover;
- no difficulty communicating in French;
- to have been informed about the study by her doctor;
- suffering from a rheumatic disease diagnosed using international disease classification criteria: ACR [2] and FIRST criteria [22] for FM, ACR criteria for RA [23]; ASAS criteria for spondyloarthritis (SpA) [24], and the criteria of Vitali et al. for Sjögren's syndrome (SS) [25].

The exclusion criteria were: HIV infection, history of cancer or blood malignancy, thyroid dysfunction and other endocrinopathies, viral hepatitis and all other comorbidities that the investigator considered to be severe (chronic heart failure, renal failure, respiratory failure, etc.). Patients with associated rheumatic diseases were also excluded. The data were collected in three French hospitals (Tours, Orleans and Paris) by a rheumatologist

and a psychologist. Informed written consent was obtained from all the participants, and the study was approved by an ethics committee.

### 2.2. Instrument

The main instrument was the Big Five Inventory (BFI) [26], validated in French by Plaisant et al. [27]. This is a self-administered questionnaire containing 45 items for five dimensions: extraversion, agreeableness, conscientiousness, neuroticism and openness to experience. Participants answered on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The BFI has good psychometric properties. Chronic pain was measured using a visual analogue scale.

### 2.3. Data analysis

Internal consistency of the dimensions of the Big Five Inventory was assessed by Cronbach's alpha coefficient,  $\alpha > .70$ , suggesting that it is good. We also used variance analysis (Student's *t*-test and ANOVA) to compare the Big Five personality traits in patients with FM: and other rheumatic diseases (RA, SpA). For SS we used the Mann-Whitney *U*-test ( $n < 30$ ). For significant ANOVAs between rheumatic diseases, post-hoc comparisons (with Bonferroni correction) were run to test the pattern of group interactions. The correlations between Big Five personality traits and pain were assessed using Bravais-Pearson correlations, and Spearman correlations for SS. We then conducted a hierarchical cluster analysis using Ward's linkage method with the squared Euclidian distance, followed by a *k*-means cluster analysis, which allocates each case to the cluster with the nearest center point. To compare clusters, we used ANOVA with partial eta squared ( $\eta^2$ ) to provide an index of effect size. Statistical analyses were performed with Statistica® version 12.

## 3. Results

### 3.1. Patients' characteristics

The sample comprised 163 French women with rheumatic diseases, mean age 47.18 years ( $\pm 10.81$  years, range 21 to 65), with 4 subgroups: 48 women with FM ( $M = 47.98$ ,  $SD = 9.69$ , range 25 to 65), 46 with RA ( $M = 50.94$ ,  $SD = 11.43$ , range 24 to 65), 46 with SpA ( $M = 42.2$ ,  $SD = 9.20$ , range 21 to 59), and 23 with SS ( $M = 48.30$ ,  $SD = 11.48$ , range 25 to 64). There was a significant difference for age across groups ( $F(3, 159) = 6.2$ ,  $P < 0.01$ ). The average education level corresponded to the end of high school with no significant difference between groups. Average duration of disease was 4.11 years ( $\pm 2.84$ , range 0.5 to 10) with significant differences between groups ( $F(3, 159) = 2.97$ ,  $P < 0.05$ ). There were 40% of menopausal women (35% with FM, 50% with RA, 26% with SpA, and 61% with SS). For FM patients, the FIRST criterion mean was 5.92 ( $\pm .28$ , range 5 to 6) and tender points mean was 16.79 ( $\pm 2.30$ , range 11 to 18).

### 3.2. Internal consistency

Internal consistency for the Big Five Inventory dimensions was evaluated for each rheumatic disease. Cronbach's alpha coefficients are presented in Table 1. They were acceptable, except for the Conscientiousness dimension in Sjögren's syndrome.

### 3.3. Comparison of the Big Five personality traits in patients with FM and other rheumatic diseases

Fig. 1 shows the personality dimension scores. First, we observed global effects. There were higher scores on agreeableness

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