

**Personality and psychopathology heterogeneity in MMPI-2 and
health-related features in fibromyalgia patients**

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Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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Abstract

Psychological aspects may play an important role as predisposing factors for fibromyalgia (FM). However, psychological heterogeneity of FM patients has been suggested. Based on two personality psychopathology clusters, we intend to explore psychological heterogeneity in FM patients, specifically, to identify if personality features had other psychological and psychopathological correlates. Secondly, we also want to identify if personality features have association with health-related correlates. The participants were female FM patients ($n = 56$) between 30 and 60 years old. The instruments were: Minnesota Multiphasic Personality Inventory (MMPI-2) content and supplementary scales, Fibromyalgia Impact Questionnaire (FIQ), and Numerical Rating Scale (NRS-11). Multivariate Analyses of Variance (MANOVAs) identified that Cluster 2 ($n = 24$), characterized by a combination of negative affectivity and social inhibition, presented a more disturbed profile, with several important features of symptomatic behavior, general maladjustment, and important clinical problem areas. The associations of personality variables with FM impact and self-reported pain are null, with the exception of *Disconstraint* dimension. In conclusion, FM patients may be very different at the psychological level, concerning personality and psychopathological features that may compromise their treatment. Personality and health related dimensions do not seem to be associated.

Keywords

Fibromyalgia; pain, personality; psychopathology

Introduction

Fibromyalgia (FM) is a syndrome characterized by musculoskeletal chronic widespread pain frequently associated with fatigue, sleep and memory problems, headache, anxiety, and depression (Häuser & Fitzcharles, 2018). Therefore, FM patients usually present considerable suffering and significant functional disability, resulting in a low health-related quality of life (Gormsen et al., 2010; Häuser et al., 2019). A meta-analysis has estimated a FM prevalence of 1.78% in the general population, of 3.98% in women and of 0.01% in men, being significantly higher in groups with specific diseases as irritable bowel syndrome and type 2 diabetes mellitus (Heidari et al., 2017). Whereas the first FM diagnostic criteria established by the American College of Rheumatology in 1990 required 11 or more of 18 specific tender points, the 2010 modified criteria excluded this examination and rely on patient self-report of pain and a listing of somatic symptoms, which led to a higher prevalence (Jones et al., 2015). In 2016, there was a revision of the 2010/2011 FM criteria (Wolfe et al., 2016), in which the major changes were the addition of a generalized pain criterion and the removal of the exclusion regarding other disorders that could explain the pain.

Although the diagnosis can be clinically established, the etiology of FM is not sufficiently understood (Thieme et al., 2017). With a focus on biological determinants, Yunus (2007) proposed the concept of central sensitization to describe alterations in the levels of particular neurotransmitters involved in controlling descending facilitatory and inhibitory pathways, which is present in FM patients. More recently, some authors have argued that the syndrome involves a complex interplay of neural, neuro-hormonal and immunological mechanisms, high basal sympathetic outflow and hypothalamic pituitary adrenal (HPA) axis hyporeactivity (Ablin et al., 2012; Arnold

et al., 2016). Twin studies suggest that approximately 50% of the risk of developing FM and related conditions is genetic, and 50% is environmental (Kato et al., 2009).

According to the biopsychosocial model of FM, psychological aspects may play an important role as predisposing factors (Eich et al., 2000; Malin & Littlejohn, 2012; Van Houdenhove et al., 2009). Specifically, some personality and psychopathology features that make people more vulnerable to stressors would be antecedent to FM and interact with biological determinants (Thiagarajah et al., 2014). As the quality of evidence of a large range of treatments for FM are only modest and has not shown significant improvement over the past two decades (Thieme et al., 2017), we think it is still important to study the syndrome under different perspectives, and highlight any contribution that emphasizes on inter-individual differences (Van Den Houte et al., 2017), and addresses the psychological aspects of FM patients (Follick et al., 2016).

In research about psychological aspects of FM, more studies compare FM patients with other chronic pathologies patients, than explore possible heterogeneity within FM samples. However, studies with the Multidimensional Pain Inventory (MPI) have identified an “adaptive cluster”, characterized by low pain, mood disturbance, and functional impairment (Walen et al., 2002), better general and mental health, self-efficacy, less fear, depression and catastrophizing (Verra et al., 2009), and a “dysfunctional cluster” with higher pain, mood disturbance, physical impairment (Walen et al., 2002), depression, catastrophizing, and lower levels of physical function and mental health (Verra et al., 2009).

Other studies have found, in general, a positive association between the intensity of physical symptoms as pain, fatigue, and morning tiredness, and psychological distress, mainly depression and anxiety, varying from two clusters

(Keller et al., 2011; Schoenfeld-Smith et al., 1995; Souza et al., 2009; Wolfe et al., 2013) to four clusters (Loevinger et al., 2012). Nevertheless, other studies show that in some or all of the clusters the severity of psychological symptoms is not positively associated with the severity of physical symptoms (Docampo et al., 2013; Follick et al., 2016; Giesecke et al., 2003; Vincent et al., 2014; Wilson et al., 2009).

With the Minnesota Multiphasic Personality Inventory (MMPI-2), which may assess a whole range of psychological and psychopathological features, most of the studies exploring heterogeneity focus on the basic clinical scales only, not exploring the supplementary or content scales. An exception is the research of Claros et al. (2006), which have found two clusters in FM sample with associated mental pathology, the larger one with a clinical psychopathological profile and concomitant significant elevations in several content and supplementary scales, meaning more pathological associated features. A meta-analysis focused on FM studies with MMPI and MMPI-2 has shown that female FM patients have a psychopathology profile significantly different than the profile of healthy volunteers, characterized primarily by elevated scores in *Hypochondriasis*, *Depression* and *Hysteria* scales, and secondarily by elevated scores in *Psychasthenia* and *Schizophrenia* scales (Novo et al., 2017a, 2017b).

However, it also suggested possible heterogeneity in FM population. In a recent cross-sectional study (Anonymous, 2019), we found heterogeneity within a community sample of FM patients, with a homogeneous age range, on MMPI-2 personality psychopathology dimensions. One cluster had clinically significant scores on *Negative Emotionality/Neuroticism* and *Introversion/Low Positive Emotionality* scales, which is in line with the distressed type or Type D personality, a specific combination of negative affectivity and social inhibition, identified in FM patients by

van Middendorp et al. (2016), while the other cluster had no significant scores. These results are relevant, as this FM community sample shows the diversity of psychological characteristics that Claros et al. (2006) identified in a mental health context FM sample.

Plus, in the aforementioned study, the clusters identification was based on clinical symptomatology, more instable by nature, while our clusters are based on personality dimensions, more structural and stable. Beyond the differentiation at the personality level, there are also different levels of psychological vulnerability, as the group with no significant personality pathology has a moderate level of psychological distress and vulnerability, while the group with Type D Personality has higher anxiety, depression, and emotional instability. This consistency at the personality and clinical level enhances the need to further explore other psychological characteristics, which express at the functional, behavioural and adaptive levels (e.g., from self-esteem to interpersonal, relations, family and marital life, and work context).

Therefore, based on heterogeneity found in structural personality psychopathology dimensions, we intend to further explore psychological heterogeneity, though MMPI-2 content and supplementary scales, which assess several important features of symptomatic behaviour, general maladjustment and relevant clinical problem areas (Graham, 2012). Thus, our main objective is to identify if personality psychopathology features have other psychological correlates. Secondly, we want to assess the relation between personality psychopathology dimensions and health-related features, namely self-reported pain level, and FM symptoms and impact.

Method

Participants

The participants were 56 female FM patients between 30 and 60 years old ($M = 45.95$; $SD = 9.39$), with a FM diagnosis confirmed by a rheumatologist, diagnosis duration in years between 1 and 10 years ($M = 4.89$, $SD = 2.56$). The inclusion criteria were: (1) age between 30 and 60 years, for a relatively homogenous age range (2) having a pure FM diagnosis (not having another rheumatic disease or painful condition) for at least six months, and (3) having levels of response consistency to MMPI-2, obtained from validity scales, within normal range for research, i.e., omissions < 10 ; VRIN and TRIN $< T80$; F and Fb < 100 .

Procedure

This research took place in a University context. It has a convenience sample, of which part of the participants were recruited within the scope of a psychological assessment service in a university center open to the community ($n = 19$), and the other were recruited through an initial contact with a FM patient's association ($n = 37$), contacted by telephone and asked about the main inclusion criteria and availability to participate in the study. All patients were assessed with the MMPI-2 by one of the two main researchers, at the university or at the association, individually and under standard instructions. From the second subsample, it was possible to collect health-related data (pain level and FM impact) and it was used to analyze these variables. The research with MMPI-2 was approved by the ethic committee of the North Lisbon Hospital Center. The written informed consent was obtained and the privacy was observed in accordance with the principles of the Declaration of Helsinki.

Instruments

We used MMPI-2 (Butcher et al., 2001) in a Portuguese version (Silva et al., 2006) to assess the patients' personality and psychopathology features. It is the most widely self-administered inventory for this purpose in adults, in different contexts

(Graham, 2012; Greene, 2011), and provides several sets of scales. In this study, we focused mainly on the five personality psychopathology scales, the 15 content scales and the 12 supplementary scales.

The Personality Psychopathology Five (PSY-5) is a set of five scales that are intended to identify the major factors based on pathological and normal range personality traits. They were labelled as: *Aggressiveness* (AGGR) that briefly identify hostile dominance of others; *Psychoticism* (PSYC) or schizotypal traits; *Disconstraint* (DISC) or impulsivity and thrill-seeking; *Negative Emotionality/Neuroticism* (NEGE) or dysphoric affect; and *Low Positive Emotionality/Introversion* (INTR) or lack of pleasant affect and slow tempo.

The Content Scales are homogeneous collection of items with similar content and they assess several important areas such as: symptomatic behaviour (*Anxiety-ANX*, *Fears-FRS*, *Obsessiveness-OBS*, *Depression-DEP*, *Health Concerns-HEA*, and *Bizarre Mentation-BIZ*); personality factor scales (*Type A Behavior-TPA* and *Cynicism-CYN*); externalizing scales (*Anger-ANG* and *Antisocial Practices-ASP*); negative self-views (*Low Self-Esteem-LSE*) and important clinical problems area scales (*Family Problems-FAM*, *Work Interference-WRK*, and *Negative Treatment Indicators-TRT*).

The Supplementary Scales are mainly developed to aid the measurement or prediction of an unusual broad range of abnormal or normal traits, and they are grouped in: factor scales (*Anxiety-A* and *Repression-R*); scales of personal resources (*Ego Strength Scale-Es*, *Dominance-Do*, and *Social Responsibility-Re*), scales of adjustment (*College Maladjustment-Mt*, *Posttraumatic Stress Disorder-PK*, *Marital Distress-MDS*, and *Social Discomfort-SOD*), scales of anger (*Hostility-Ho* and

Overcontrolled-Hostility-O-H), and scales of gender role identification (*Masculine Gender Role-GM* and *Feminine Gender Role-GF*).

The results are converted into normalized T-scores, and in general terms, $T > 65$ are clinically significant. Content and supplementary scales have good test-retest coefficients (between .69 and .91), and internal consistency coefficients are generally above .70.

The Portuguese version of the Fibromyalgia Impact Questionnaire (FIQ; Burckhardt et al., 1991; Rosado et al., 2006) was used to evaluate the patients' disability, or FM impact on quality of life. It is a self-administered questionnaire measuring specifically work difficulty, pain, fatigue, morning tiredness, stiffness, anxiety, and depression. The maximum score is 100, meaning more disability and greater impact of the syndrome. The internal consistency of the national version was $\alpha = .81$.

To measure the reported pain intensity, we used the Numerical Rating Scale, with 11 points (NRS-11), asking the patients to rate the pain they felt in the last seven days, between 0 ("no pain") and 10 ("the worst pain possible"). This scale has a generalized clinical use due to simple administration that favors compliance (Hartrick et al., 2003).

Data analysis

We conducted K-means non-hierarchical cluster analysis, based on the five MMPI-2 personality psychopathology scales (PSY-5: AGGR, PSYC, DISC, NEGE and INTR) to identify clusters. We used Chi-Square test to identify the differences between the clusters in the sociodemographic nominal and ordinal variables and a one-way analysis of variance (ANOVA) to test the differences in age and diagnosis duration. We used Multivariate Analysis of Variance (MANOVA) to test the

differences between the clusters in the MMPI-2 content and supplementary scales. Finally, we analyzed the subsample from which we have health-related data (impact of FM and self-reported pain) and used Spearman correlation coefficient to assess the association between these two variables and the personality psychopathology ones.

Results

The K-means cluster analysis identified two clusters, Cluster 1 ($n = 32$) and Cluster 2 ($n = 24$). The clusters have no significant differences in age, diagnosis duration in years, and sociodemographic variables, and have relevant differences in the MMPI-2 personality psychopathology dimensions: Cluster 1 has no clinically significant scores on the five scales ($T \geq 65$), while Cluster 2 has clinically significant scores on NEGE and INTR scales. There are also significant differences in the clinical scales, as Cluster 2 shows greater elevations in *Depression*, *Schizophrenia* and *Psychasthenia* scales, meaning greater anxiety, turmoil and sense of personal and social alienation. The process of clusters constitution and its characterization is detailed in Anonymous (2019). Cluster 1 will be labeled “Emotional Vulnerability Cluster” (EV Cluster) and Cluster 2 will be labeled “Emotional and Personality Vulnerability” (EPV Cluster).

[INSERT TABLE 1 HERE]

In the composite of the MMPI-2 supplementary scales, the MANOVA showed significant differences between the two clusters (Wilk's $\Lambda = .060$; $F(12,43) = 4.203$; $p = .000$; $\eta^2_p = .540$). As we may see in Figure 1, EPV Cluster had significantly higher levels on A, R, Mt, PK, and MDS scales, and significantly lower levels on Do scale. All these scores, except for *Anxiety* scale, were clinically significant ($T \geq 65$ on R, Mt, PK, and MDS scales, and $T \leq 40$ on Do). Both clusters had $T \leq 40$ on Es scale.

[INSERT FIGURE 1 HERE]

The MANOVA showed significant differences between the two clusters in the MMPI-2 content scales (Wilk's $\Lambda = .440$; $F(15,40) = 3.391$; $p = .001$; $\eta^2_{\text{par}} = .560$). As presented in Figure 2, EPV Cluster had significantly higher levels on ANX, OBS, DEP, LSE, SOD, WRK, and TRT scales, being the scores clinically significant ($T \geq 65$) on ANX, DEP and WRK scales. Both clusters had clinically significant scores on HEA.

[INSERT FIGURE 2 HERE]

As the final step, using the data of the subsample ($n = 37$) assessed in the health-related variables, the Spearman correlation coefficient showed a moderate negative correlation between DISC and pain level (Table 2).

[INSERT TABLE 2 HERE]

Discussion

The main aim of this study was to identify if psychological heterogeneity in a sample of FM female patients, based on personality and psychopathology features, had other psychological correlates. This was confirmed, as one cluster was characterized by clinically significant scores on *Negative Emotionality/Neuroticism* and *Introversion/Low Positive Emotionality*, and also clinically significant scores in *Repression*, *College Maladjustment*, *Post-Traumatic Stress Disorder*, *Marital Distress*, *Dominance*, *Gender Role Masculine*, *Anxiety*, *Depression*, and *Work Interference* scales, what means a more disturbed profile in terms of general and emotional maladjustment, symptomatic behaviour and important clinical problem areas.

College Maladjustment, *Post-Traumatic Stress Disorder*, and *Marital Distress* scales constitute the *Generalized Emotional Distress Index* (Butcher et al., 2001; Graham, 2012). *College Maladjustment* scores have been found to be associated with

increased stress and lowered social and general adjustment (Stewart & Cairns, 2002), and may also indicate, on a global level, that the person has a history of inadequate coping and functioning. *Post-Traumatic Stress Disorder* scale is suggested to be a measure of general psychopathology, maladjustment and dysphoric feelings, more than a measure of post-traumatic stress disorder (PTSD) (Moody & Kish, 1989). Higher scores of PTSD were related to higher neuroticism and introversion/low positive emotionality in a law enforcement employees sample (Haisch & Meyers, 2004), and to higher general emotional and psychological distress and lower ego strength (Moody & Kish, 1989), which is in line with our results in the EPV Cluster.

With regard to *Marital Distress* scale, in a study with FM patients and their co-residing partners, these partners, on average, rated patient fatigue significantly lower than patients (Lyons et al., 2013). So, it seems that it is difficult for the chronic pain patient partner to correctly estimate the patient pain and disability, and this seems to be worse in the case of FM, as invisibility causes difficulty for those who interact with patients, namely, the spouse (Söderberg et al., 2003). Increased partner burden was associated with lower levels of partner support in the FM group, and not in another chronic pain sample with obvious disability and well understood etiology, seeming that the uncertain and not obvious features of FM may harm these patients and their partner's relation (Reich et al., 2006).

Depression and *Anxiety* negatively affect the daily living, and have been significantly associated with future negative health outcomes. Tesio et al. (2018) have found an extensive prevalence of clinically significant depressive and anxiety symptoms in FM patients, both present in about 60% of the sample, and that depressive symptoms have a negative effect on both physical and mental components of quality of life.

Repression scale is better discussed in a conjoint interpretation with *Anxiety* scale, which provides a picture about the level of emotional distress and how it is handled, more or less defensively. Comparing the two clusters at this level, their mean scores show that they are both likely to be experiencing a mild level of emotional distress, but while the EV Cluster shows adequate resources for coping with the problems and is likely to externalize these problems, the EPV Cluster seems like trying to inhibit or suppress any awareness of the problems, a pattern that may reflect more chronic problems in patients who are defensive and guarded (Greene, 2011).

The *Work Interference* scale refers to a wide variety of attitudes and behaviors that are likely to contribute to poor work performance, as low self-confidence, poor concentration, obsessiveness, tension, indecisiveness, not having strong achievement orientation and possibly having negative attitude toward coworkers (Graham, 2012). So, it encompasses a whole set of features beyond work environment directly, as other correlates of the scale include lacking energy, being unable to cope with stress, and feeling overwhelmed, insecure, helpless, worried, and fearful (Barthlow et al., 2004). Although several studies focus the difficulties FM women feel toward the work environment, and decreased work ability (Henriksson et al., 2005; Mannerkorpi & Gard, 2012), EV Cluster does not show relevant levels in this scale. Finally, the significantly low scores of EPV Cluster on *Gender Role-Masculine* and on *Dominance* scales go along the same meaning of lack of assertiveness and low self-confidence in the personal and social role (Greene, 2011).

Apart from heterogeneity, it was still possible to identify which aspects represent common features of FM patients, as both clusters are characterized by clinically elevated scores on *Health Concerns* scale and clinically low scores on *Ego Strength* scale. The *Health Concerns* scale is normally elevated in chronic pain patients

(Keller & Butcher, 1991; Slesinger et al., 2002), but it goes beyond physical concerns clearly associated with the health problems, and better reflects the psychological representation of health problems. In a sample of non-chronic pain, victims of work bullying, the group with the lowest exposure specific negative actions had a more disturbed MMPI-2 clinical profile, and significantly higher anxiety, depression and health concerns, showing this scale is associated with psychological suffering (Matthiesen & Einarsen, 2001). The *Ego Strength* scale is a useful assessment device of adaptability and personal resourcefulness (Barron, 1953), and the relationship of the scale scores with therapeutic outcomes in several cross-validating samples led to the conclusion that previous ego strength is a significant determinant of personality change in psychotherapy. In a wide sample of medical students, the ego strength score, along with other two variables, determined 37% of variance of the total score of mental health (Jamil et al., 2015).

Finally, there was only one significant correlation between the five personality psychopathology variables and the health-related ones, a moderate negative correlation of *Disconstraint* with pain level. It seems relevant that, in general, the personality features did not show any association to these more physical symptoms. This finding is inconsistent with Neuroticism being associated with higher chronic pain (Bucout et al., 2017) and higher FM impact and symptom severity in FM patients (Malin & Littlejohn, 2012; Seto et al., 2019). However, it is in line with Vendrig et al. (2000), in which lower levels on *Introversion/Low Positive Emotionality* scales did not correlate with pain intensity and self-reported disability, and with Type D personality being much more strongly associated with poor mental health than with poor physical health (Ablin et al., 2016; van Middendorp et al., 2016). *Disconstraint*, at a moderate level, pertains to sensation seeking, activity, sexual disinhibition, spontaneity, broad

interests, and higher pain may hinder this “freedom of living” and lead to more rigidity and a more constrained way of life. In a broader sense, beyond personality studies, this is also in line with results in which the severity of psychological symptoms is not linearly related with the severity of physical symptoms (Docampo et al., 2013; Follick et al., 2016; Giesecke et al; 2003; Vincent et al, 2014; Wilson et al., 2009).

The notion that FM patients may be very different at the psychological level, concerning personality and psychopathological features that may compromise any regular chronic pain treatment, brings a relevant implication for intervention with these patients. The EPV Cluster has greater emotional difficulties and structural vulnerability, which reflects in higher behavioural and adaptive difficulties (e.g., interpersonal, family and work relations). These more disturbed patients, with more stable and structural relevant personality features and other psychological negative correlates, probably need a deeper and more prolonged psychological intervention, comparing with a more standard psychological intervention that may serve less disturbed patients. Finally, in our point of view, this almost lack of association between personality features and health-related variables is important because it may support the possible role of psychological aspects as predisponents for FM, more stable and structural, and not merely resulting from disability and pain.

This study has some limitations, mainly the sample dimension, which may have limited the statistical significance of the findings, and data from FM impact and pain level not available from the whole sample. The sample is composed by women only, what makes the interpretations appropriate to female FM patients only. The health-related features – FM impact and pain – was self-reported, and it would be important to compare them with more objective physical indicators. As positive aspects, we have a FM community sample, with a homogeneous age range. To our best knowledge it is

also the first study exploring the heterogeneity in symptomatic behaviour, general maladjustment and relevant clinical problem areas of FM patients, based exclusively on structural and relatively stable personality psychopathology features, assessed through the MMPI-2 content and supplementary scales.

In future research it would be important to study adherence to treatments – both medical and psychological interventions – and treatment results in FM patients, and relate them to the personality and psychopathology features. In the same vein, to monitor the clinical progress and test the expected stability of the personality features. Finally, it would be interesting to assess the emotional and relational features with implicit personality techniques.

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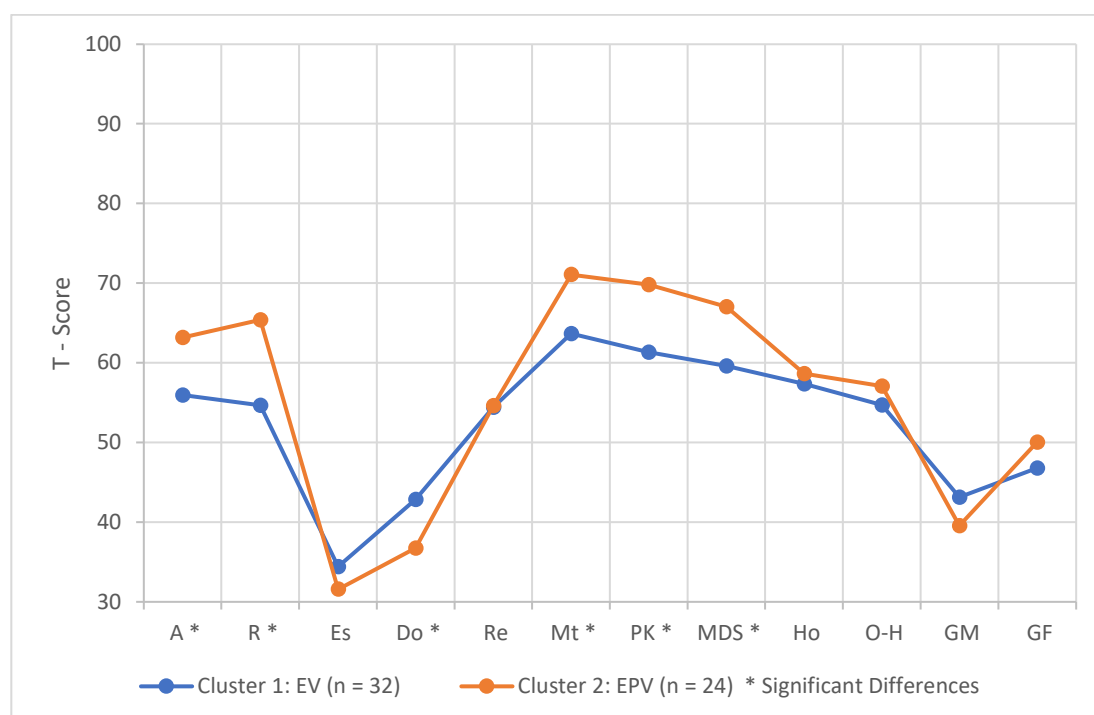
Table 1

Sociodemographic and health characteristics of FM participants

	Cluster 1: EV*		Cluster 2: EPV**			
	(n = 32)		(n = 24)			
	M	SD	M	SD	F	p
Age	44.38	9.34	48.04	9.22	2.14	.250
Diagnosis duration	4.98	2.56	5.78	3.66	.896	.348
	f	%	f	%	χ ²	p
Marital Status					2.21	.331
Single	5	15.6	2	8.3		
Married/cohabiting	21	65.6	20	83,3		
Divorced/separated	6	18.8	2	8.3		
Educational level						
1 st cycle	0	0	2	8.3	5.65	.464
2 nd cycle	2	6.3	2	8.3		
3 rd cycle	3	9.4	4	16.7		
Secondary	12	37.5	7	29.2		
Bachelor	1	3.1	2	8.3		
University graduation	12	37.5	5	20.8		
Master	2	6.3	2	8.3		
Occupational status					2.34	.505
Working	22	68.8	15	62.5		
Unemployed	4	12.5	1	4.2		
Retired	4	12.5	5	20.8		
Other	2	6.3	3	12.5		

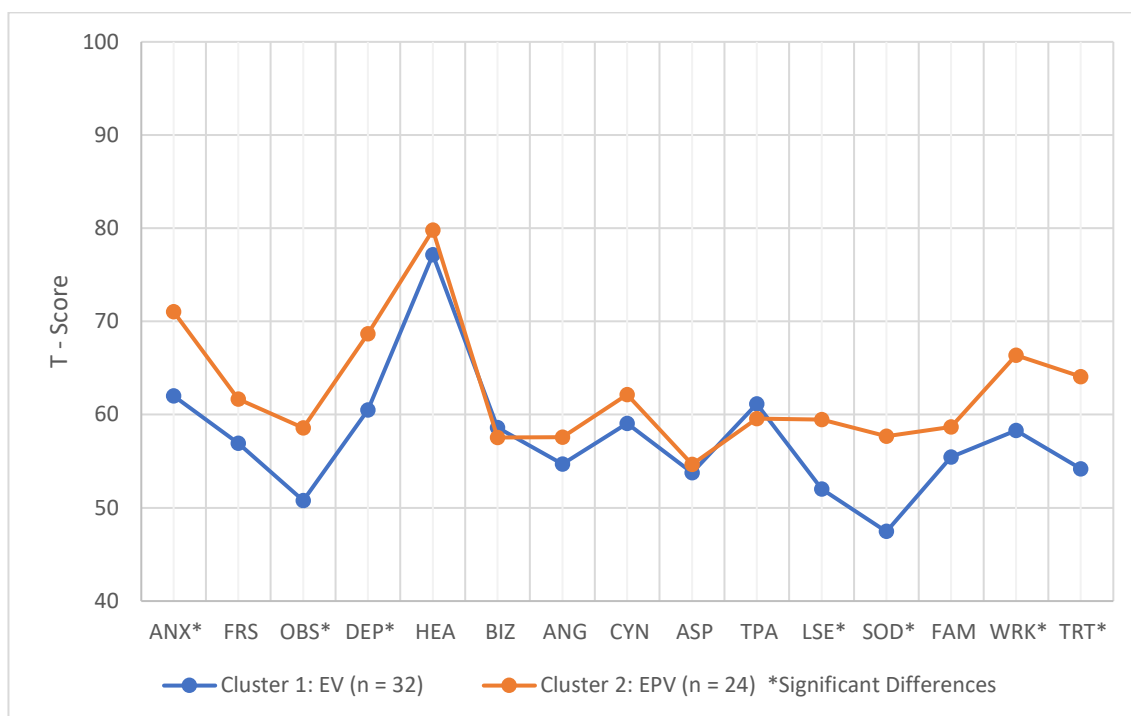
Note. *EV = Emotional Vulnerability. **EPV = Emotional and Personality Vulnerability.

Figure 1. MMPI-2 Supplementary scales profiles for Clusters 1 and 2



Note. EV = Emotional Vulnerability; EPV = Emotional and Personality Vulnerability; A = Anxiety; R = Repression; Es = Ego Strength; Do = Dominance; Re = Social Responsibility; Mt = College Maladjustment; PK = Post-Traumatic Stress Disorder; MDS = Marital Distress; Ho = Hostility; O-H = Over-Controlled Hostility; GM = Gender Role Masculine; GF = Gender Role Feminine.

Figure 2. MMPI-2 Content scales profiles for Clusters 1 and 2



Note. EV = Emotional Vulnerability; EPV = Emotional and Personality Vulnerability; ANX = *Anxiety*; FRS = *Fears*; OBS = *Obsessiveness*; DEP = *Depression*; HEA = *Health Concerns*; BIZ = *Bizarre Mentation*; ANG = *Anger*; CYN = *Cynicism*; ASP = *Antisocial Practices*; TPA = *Type A Behavior*; LSE = *Low Self-Esteem*; FAM = *Family Problems*; WRK = *Work Interference*; TRT = *Negative Treatment Indicators*.

Table 2

Descriptive statistics and correlations (r_s) for Health measures and Personality Scales (PSY-5)

	<i>M</i>	<i>SD</i>	FIQ	NRS-11
1. Impact of disease (FIQ)	59.81	12.96	-	
2. Pain Intensity (NRS-11)	6.30	1.58	.583**	-
3. AGGR	52.70	8.63	-.075	-.170
4. PSYC	56.84	9.27	.186	-.070
5. DISC	46.92	7.94	.216	-.356*
6. NEGE	58.51	10.76	.263	.152
7. INTR	54.59	9.98	.252	.139

Note. ($n = 37$) r_s = Spearman rank order correlation. FIQ = Fibromyalgia Impact

Questionnaire; NRS-11 = Numerical Rating Scale; AGGR = *Aggressiveness*; PSYC =

Psychoticism; DISC = *Disconstraint*; NEGE = *Negative Emotionality/Neuroticism*; INTR =

Introversion/Low Positive Emotionality.

* $p < .05$. ** $p < .01$.