Personality and Individual Differences 116 (2017) 96–108

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Review

A meta-analysis of studies with the Minnesota Multiphasic Personality Inventory in fibromyalgia patients

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ARTICLE INFO

Article history:
Received 2 September 2016
Received in revised form 30 January 2017
Accepted 13 April 2017
Available online xxxx

Keywords:
Fibromyalgia
MMPI
Meta-analysis
Personality traits
Psychopathology

ABSTRACT

The Minnesota Multiphasic Personality Inventory (MMPI) has been widely used to assess personality and psychopathology in patients diagnosed with fibromyalgia, and the results have been contradictory. This work aims primarily at analysing whether the available empirical results with this instrument allow for a conclusion about personality traits and psychopathology of patients with fibromyalgia. Complementary, we evaluated whether the MMPI was able to discriminate these patients from healthy control groups. We carried a search on Medline, PsycINFO and Cochrane Database of Systematic Reviews, about studies evaluating personality and psychopathology of fibromyalgia patients with the MMPI, and the reference lists of retrieved studies were scanned for additional articles. A total of 11 studies fulfilled the inclusion criteria and were included. The hypochondriasis, depression, hysteria and schizophrenia scales were the more frequently elevated clinical scales across the included studies. A statistically significant heterogeneity was observed in all clinical scales. This meta-analysis confirmed the existence of a significant elevation in the neurotic triad. The considerable heterogeneity suggests that the fibromyalgia population is a heterogeneous group regarding personality and psychopathology profiles. The MMPI showed to be able to discriminate female patients with fibromyalgia from healthy volunteers.

1. Introduction

Fibromyalgia (FM) is a common chronic syndrome mainly characterized by widespread musculoskeletal pain (Malin & Littlejohn, 2012; Staud, 2007). Its prevalence varies from 2 to 4% in the general population and is considerably higher in women than in men (ratio of 9:1, respectively), according to Fitzcharles and Yunus (2012). Although it has become very probable that the illness has a neurobiological substrate including subtle disturbances in physiological regulatory systems (Van Houdenhove & Luyten, 2007), and dysfunctions in the nervous system pain processing may explain the constant pain in the absence of tissue damage (Bellato et al., 2012), the etiology of fibromyalgia remains unknown.

Fibromyalgia was defined by the American College of Rheumatology (ACR) 1990 classification criteria as the presence of widespread pain for at least 3 months, combined with tenderness in 11 or more of 18 specific anatomical points, known as tender points, when a pressure of 4 kg/cm is applied (Wolfe et al., 1990). The pain often co-exists with other symptoms, such as fatigue, poor quality sleep, cognitive disturbance and emotional distress (Malin & Littlejohn, 2012). Although the 1990 ACR classification has been the predominant diagnostic criteria, these criteria are broad and non-specific, resulting in a high variability among diagnosed individuals (Wilson, Robinson, & Turk, 2009), not only in the symptomology but also in the underlying biologic, psychological, and cognitive factors (Giesecke et al., 2003).

Despite the lack of consensus among clinicians and researchers, the role of a complex interaction between biological, psychological and social factors in the onset and evolution of fibromyalgia is generally accepted (Bernardy, Klose, Busch, Choy, & Häuser, 2013; Eich, Hartmann, Muller, & Fischer, 2000; Thieme, Turk, Gracely, Maixner, & Flor, 2015). A biopsychosocial model of the etiology and pathogenesis of FM has been proposed, in which physiological, psychological and social factors are interacting in different ways and at different stages, as precipitating, predisposing, and perpetuating, suggesting that multiple pathways may lead to the causation and persistence of the illness (Eich et al., 2000). As a psychological factor, personality may play a role as predisposing and perpetuating (Van Houdenhove, Kempke, & Luyten, 2010; Van Houdenhove, Luyten, & Egle, 2009). Within this framework, FM can be conceptualized as the end stage of an accumulation of biological and

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http://dx.doi.org/10.1016/j.paid.2017.04.026
0191-8869/

psychosocial vulnerability factors, over time, which have a formative influence on the development of the locomotor system and lead, in interaction with later stress, to dysfunctional states (Eich et al., 2000). In the same vein, Thiagarajah, Guymer, Leech, and Littlejohn (2014) have conceptualized a diathesis-stress model of fibromyalgia that implies an understanding of vulnerability factors to fibromyalgia, which contribute towards the perpetuation of a pathological response to a stressor. The symptoms of fibromyalgia and stress would then contribute to the prolongation of symptoms, as the pain from fibromyalgia could continue to be a source of physical stress and chronic stress symptoms could feed back into the HPA axis.

Research has found heterogeneity in FM samples, with differences between patients in a continuum of physical disability and psychological distress. Thieme, Turk, and Flor (2004) identified three subgroups of fibromyalgia patients: dysfunctional, with greater pain severity and interference, greater psychological distress and lower activity, interpersonally distressed, and adaptive copers, with lower pain severity and interference and less distress. Giesecke et al. (2003) found a group of fibromyalgia patients who exhibit extreme tenderness but lack any associated psychological/cognitive factors, an intermediate group with moderate tenderness and normal mood, and a group in whom mood and cognitive factors may be significantly influencing the symptom expression and report. Thus, studies have found diversity not only in clinical symptoms of FM patients, but also in the relative contribution of associated biological and psychological factors.

Pertaining to psychopathology in FM, fibromyalgia has been linked to mood disorders in 50–70% of patients, more precisely, with major depression (Arnold et al., 2006; Arroita et al., 2009) anxiety disorders (Raphael, Janal, Nayak, Schwartz, & Gallagher, 2006) and a prevalence rate of any psychiatric disorder significantly higher than the one of healthy control subjects and the estimated prevalence in the general population (Uguz et al., 2010). The prevalence rate of personality disorders has ranged from 31.1% (Uguz et al., 2010) and 8.7% only (Thieme et al., 2004). However, it is worth mentioning that the higher rates of psychiatric comorbidities may be biased by the fact that most studies with FM have used clinical samples of tertiary-care centers (Williams & Clauw, 2009).

In comparison with rheumatoid arthritis, which has been the most used chronic pain group in studies with FM, the FM samples has shown more depression (Wolfe & Michaud, 2009), more depression and anxiety (Ramundo, 2000; Walker et al., 1997), less mental health (Salaffi et al., 2009), and more alexithymia (Sayar, Gulec, & Topbas, 2004). However, some studies have found no differences between the two conditions in depression (Ahles, Yunus, & Masi, 1987; Çeliker & Borman, 2001; Ofluoglu et al., 2005) and in lifetime history of any psychiatric disorder (Ahles, Khan, Yunus, Spiegel, & Masi, 1991).

Studies have found differences within the fibromyalgia patients, varying from patients showing no evidence of psychological disturbance to patients with severe disturbance (Belenguer, Ramos-Casals, Siso, & Rivera, 2009; Claros et al., 2006; Oswald, Salemi, Michel, & Sprott, 2008; Souza et al., 2009), and, accordingly to Raphael et al. (2006), FM group and women without FM had similar risk of lifetime major depression disorder.

In respect of personality, several studies have found higher neuroticism in FM patients than in healthy controls (Malt, Olafsson, Lund, & Ursin, 2002; Martín, Luque, Solé, Mengual, & Granados, 2000; Martin-McAllen, 1997).

2. The Minnesota Multiphasic Personality Inventory and fibromyalgia

The Minnesota Multiphasic Personality Inventory (MMPI) is the most widely used self-report questionnaire for the assessment of personality and psychopathological features in adults, in several contexts (Graham, 2011; Greene, 2000). This inventory has been extensively used in the medical setting, in health and chronic disease contexts (Arbisi & Butcher, 2004; Ardiç & Toraman, 2002; Malin & Littlejohn, 2012), leading to a collection of substantial empiric data. These data provide an objective basis for the inferences based on the MMPI regarding emotional reactions, psychological characteristics, and personality traits of medical patients. Globally, the research of personality factors in the assessment of chronic pain has been one of the most common uses of MMPI, having demonstrated that the chronic patients' patterns are virtually the same cross-culturally (Arbisi & Butcher, 2004). Pertaining to chronic pain, Keller and Butcher (1991) have found a predominant MMPI clinical profile in the chronic pain patients, mainly characterized by elevations in scales that identify features related to hypochondriasis, hysteria and depression, which have been named *neurotic triad*.

The MMPI has revealed significant differences between patients with fibromyalgia and healthy individuals, with the former presenting more elevations in the clinical profile (e.g., Gonzalez, Baptista, Branco, & Novo, 2015; Pérez-Pareja, Sesé, González-Ordi, & Palmer, 2010; Vural, Berkol, Erdogdu, Kucukserat & Aksoy, 2014). In some cases, FM group has clinically significant elevations in several scales (Gonzalez, 2014; Pérez-Pareja et al., 2010), whereas in other cases, although significantly higher than healthy controls, only two scales are clinically elevated in the FM group (e.g., Vural, Berkol, Erdogdu, Kucukserat & Aksoy, 2014). MMPI has also identified different profiles among fibromyalgia patients, namely the normal profile, (i.e., no clinical significant score), a chronic pain typical profile (i.e., with features associated to hypochondriasis and hysteria, and depression), and, in some cases, a concomitant elevation of other clinical scales (i.e., elevation of at least four clinical scales), identifying a psychopathological profile (Ahles, Yunus, Riley, Bradley, & Masi, 1984; Bennett et al., 1996; Carette et al., 1994; Porter-Moffitt et al., 2006; Yunus, Ahles, Aldag, & Masi, 1991).

The number of identified profile types varied between two (Claros et al., 2006) and four (e.g., Porter-Moffitt et al., 2006), and the proportion of patients in each profile type varied across the studies, with some studies founding a huge prevalence of psychopathological profile (Claros et al., 2006; Porter-Moffitt et al., 2006) and others founding a small prevalence of psychopathological profile (Yunus et al., 1991) and a predominant normal profile (Ahles, Yunus, Gaulier, Riley, & Masi, 1986). Moreover, whereas some studies identified a neurotic triad profile, the most commonly associated with chronic pain (Ellertsen, Værøy, Endresen, & Førre, 1991; Gonzalez et al., 2015), others identified a *Conversion V* profile (Bennett et al., 1996; Binder et al., 2000; Claros et al., 2006), in which hypochondriasis and hysteria are significantly elevated and greater than depression by eight or more points, meaning that psychological suffering would be translated into enhanced physical symptoms. Finally, within the psychopathological profile, the clinically significant elevations range from four (e.g., Johnson et al., 2010; Trygg, Lundberg, Rosenlund, Timpka, & Gerdle, 2002) to seven (e.g., Claros et al., 2006; Kaplan, Meadows, Vincent, Logigian, & Steere, 1992).

In respect of comparison with rheumatoid arthritis, the FM group has shown higher scores in several clinical scales (Ahles et al., 1984; Payne et al., 1982; Wolfe et al., 1984), and FM group have less patients with the normal profile (Wolfe et al., 1984), and more patients with the psychopathological profile (Ahles et al., 1984) than rheumatoid arthritis patients. FM group has higher scores than other pain groups with chronic non widespread pain in four or more clinical scales (Pérez-Pareja et al., 2010; Porter-Moffitt et al., 2006; Trygg et al., 2002).

In conclusion, there is a considerable diversity in the syndrome of fibromyalgia, in what concerns the association between physical symptoms and psychopathological features. The data about personality profiles in FM and differences between fibromyalgia and healthy controls is also inconclusive. To our best knowledge, there is no meta-analysis of psychopathology and/or personality in fibromyalgia, which would help clarify these distinct and contradictory findings, coming from different kinds of samples and assessment methods.

Concerning the psychometric instruments used to assess psychopathology and personality in FM samples, the majority of them assess a