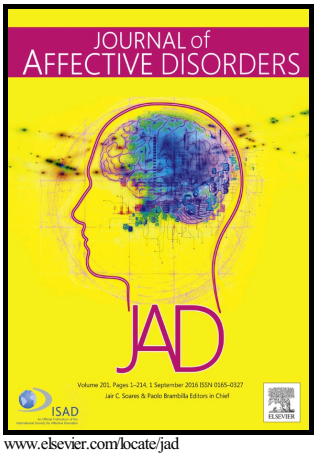

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Pain experience in Fibromyalgia Syndrome: The role of alexithymia and psychological distress

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Abstract

Background

Fibromyalgia (FM) is a chronic pain syndrome with a high prevalence of alexithymia, a personality disposition that affects emotional self-awareness. The present study aimed to investigate the relationship between alexithymia and pain, differentiating between the sensory and affective components of pain experience, in a sample of FM patients.

Methods

One hundred and fifty-nine FM patients completed a battery of tests assessing pain experience, pain intensity, alexithymia and psychological distress. In order to characterize the clinical profile of alexithymic FM patients, alexithymic and non-alexithymic groups were compared on the different measures. Two regression analyses were performed on the total sample, in order to investigate the relationship between alexithymia and pain, controlling for psychological distress.

Results

Alexithymic FM patients presented higher scores on all the clinical measures compared to non-alexithymic ones. Positive correlations were found between alexithymia and the affective, but not the sensory, dimension of pain experience variables. Regression analyses showed that alexithymia (difficulty identifying feelings factor) ceased to uniquely predict affective pain, after controlling for psychological distress, particularly anxiety. In addition, none of the alexithymia variables significantly explained pain intensity variance. Finally, a significant effect of anxiety in mediating the relationship between alexithymia and affective pain was found.

Limitations

No longitudinal data were included.

Conclusions

These findings show the presence of higher levels of pain and psychological distress in alexithymic vs. non-alexithymic FM patients, and a relevant association between alexithymia and the affective

dimension of pain experience. Specifically, this relationship appears to be significantly mediated by anxiety.

Abbreviations

FM, Fibromyalgia; FIOU, Fibromyalgia Integrated Outpatient Unit; QUID, Questionario Italiano sul Dolore; FIQ, Fibromyalgia Impact Questionnaire; TAS-20, Toronto Alexithymia Scale; DIF, Difficulty Identifying Feelings; DDF: Difficulty Describing Feelings; EOT, Externally-Oriented Thinking; HADS, Hospital Anxiety and Depression Scale; DT, Distress Thermometer; VIF, Variance Inflation Factor

Keywords: Fibromyalgia; Alexithymia; Pain; Anxiety; Depression; Emotional distress.

Introduction

Fibromyalgia (FM) is a syndrome primarily characterized by chronic, widespread musculoskeletal pain (Mease et al., 2005; Mease et al., 2009). Its prevalence is estimated to be 3–6% of the world population (WHO, 2008) and it occurs predominantly in women (Anderberg et al., 2000; Branco et al., 2010). The etiology of this syndrome is not completely understood, but growing evidence suggests that FM could be considered a *central sensitization syndrome*, caused by increased sensitivity of the central nervous system to pain signals (Williams and Gracely, 2006).
Although pain represents the core feature of FM, the symptomatology often includes a heterogeneous series of other conditions, such as physical and mental fatigue, disrupted or non-restorative sleep, headache, irritable bowel, psychiatric disorders, cognitive impairment, and other functional complaints (Abeles et al., 2007; Mease et al., 2005; Schmidt-Wilcke and Clauw, 2011). Among the psychological factors, a high prevalence of depression (20–80%) and anxiety disorders (13–64%) has been widely reported (Fietta et al., 2007; Montoya et al., 2005). Only recently have researchers started to focus their attention also on alexithymia, a personality trait, largely observed in "psychosomatic" disorders (Taylor, 2000). Alexithymia is characterized by difficulty in identifying and describing subjective feelings, difficulty in distinguishing between feelings and bodily sensations of emotional arousal, restricted imagination processes, and a stimulus-bound, externally oriented cognitive style (Sifneos, 1972; Taylor et al., 1997). Most of the studies have reported high levels of alexithymia in FM patients, suggesting the presence of a deficit in emotional self-awareness (Castelli et al., 2012; Di Tella et al., 2015; Sayar et al., 2004; Steinweg et al., 2011). The inability to adequately identify one's own feelings could interfere with the successful regulation of emotions, resulting in increased negative affects and chronic sympathetic hyperarousal (Lumley et al., 1996). Moreover, the failure to correctly recognize physical sensations as the bodily expressions of emotions could lead alexithymic individuals to misinterpret their emotional arousal

as signs of disease, further worsening the whole symptomatology (Lumley et al., 1996; Tuzer et al., 2011).

Previous studies have, in fact, shown a strong positive association between alexithymia scores and scores for negative affectivity, especially anxiety and depression (Honkalamp et al., 2000; Luminet et al., 2001; Malt et al., 2002), suggesting a possible role of alexithymia in intensifying psychological distress.

Alexithymia has also been found to be positively associated with pain intensity and pain-related functioning in different chronic pain conditions (Glaros and Lumley, 2005; Lumley et al., 2002). However, the results are still controversial and in some cases non-significant associations (Cox et al., 1994; Friedberg and Quick, 2007; Millard and Kinsler, 1992) or mixed results have been yielded (Celikel and Saatcioglu, 2006; Lumley et al., 2005). This pattern of outcomes has also been shown in FM syndrome; no correlation or positive association was found between alexithymia and different pain measures (Huber et al., 2009; Malt et al., 2002; Martínez et al., 2015; Sayar et al., 2004). One possible explanation for these unclear results is the multidimensional characterization of pain. Pain, indeed, is not a unique entity, but includes at least two components, one sensory and the other affective (Lumley et al., 2002; Melzack and Katz, 1999). The sensory dimension refers more to the intensity of pain perception, while the affective one can be considered the unpleasant feelings experienced as a consequence of chronic pain. Discriminating between these two components is important because they are influenced by different mechanisms and based on specialized brain systems (Melzack and Casey, 1968; Melzack and Wall, 1988). The sensory-discriminative dimension of pain is influenced primarily by the rapidly conducting spinal systems (the neospinothalamic tract, the spinocervical tract, and the post-synaptic neurons in the dorsal column system), while the motivational-affective dimension of pain appears to be regulated by the brainstem reticular formation and the limbic system, which receive projections from the somatosentory pathway.

The studies which have taken this distinction into account showed that alexithymia might be related mostly to the affective, rather than the sensory, dimension of pain and that this association could be mediated by psychological distress, especially depression (Honkalamp et al., 2000; Huber et al., 2009; Lumley et al., 2002; Malt et al., 2002).

Given this uncertain evidence, the present study aimed at throwing light on the relationship between alexithymia and pain in a large sample of FM patients, differentiating between the sensory and affective dimensions of pain experience on the basis of Melzack and Casey's model (1968).

To achieve this aim, the following specific goals were addressed:

1. To characterize, for the first time, the clinical profile of alexithymic FM patients by

comparing them to non-alexithymic ones on pain (pain experience and pain intensity) and psychological distress (anxiety, depression and emotional distress).

2. To investigate, by means of multiple hierarchical regression analyses, the relationship between alexithymia and pain, controlling for psychological distress (anxiety, depression and emotional distress).

Methods

Participants and procedure

One hundred and fifty-nine female participants with FM (52.5 ± 10.2 years of age) were consecutively recruited from the Fibromyalgia Integrated Outpatient Unit (FIOU), a multidisciplinary unit based on the collaboration between rheumatologists, psychologists and psychiatrists at the San Giovanni Battista University Hospital of Turin. All patients had a main diagnosis of fibromyalgia, made by an expert rheumatologist in the field. The exclusion criteria were: under 18 years old, low educational level (<5 years) or insufficient knowledge of the Italian language, and the presence or history of a neurological or severe psychiatric disorder.

The usual clinical procedure for FM patients included a first visit to the rheumatologist who made/confirmed the diagnosis of FM, and a second visit to a psychologist and a psychiatrist together with the rheumatologist to formalize the patient's care by the FIOU. At a separate session, participants filled out psychological questionnaires, after a clinical interview.

The study was approved by the "*Città della Salute e della Scienza*", Hospital of Turin ethics committee and was conducted in accordance with the Declaration of Helsinki. All the participants gave their written informed consent to participate in the study.

Measures

Pain evaluation

The *Questionario Italiano sul Dolore* (QUID) (De Benedittis et al., 1988), the Italian adaptation of the McGill Pain Questionnaire (Melzack and Katz, 1992; Melzack and Katz, 1999), is a self-report measure used to assess an individual's pain experience. Patients chose the adjectives from 16 subclasses to describe their pain during the previous month. The adjectives from the categories are reported as follows: sensory (periodic, pulsing, pounding, penetrating, burning, smarting, tender); affective (exhausting, nauseating, suffocating, distressing, hurting); evaluative (annoying, worrying, tormenting, nagging, troublesome); mixed (sensory-evaluative; sensory-affective; evaluative).

For the purposes of the present study, only the scores on the sensory (QUID-S) and the affective (QUID-A) dimensions were reported, expressed as a portion of the maximum possible score in each

subscale (which ranges from 0 to 1). Several studies have shown the stability and high internal consistency of the QUID, as well as the concurrent, predictive and construct validity of its component (De Benedittis et al., 1988).

In addition, as an index of pain intensity, the item "Pain" of the Italian version of the Fibromyalgia Impact Questionnaire (FIQ) (Bennett, 2005; Sarzi-Puttini et al., 2003) was used to assess the average intensity of pain in the previous week on a scale ranging between 0 and 10. The questionnaire evaluates the severity of disability due to FM and it includes 20 items. The overall score range from 0 to 100, with the highest score corresponding to the highest level of impairment.

Alexithymia

Alexithymia was assessed using the Italian version of the Toronto Alexithymia Scale (TAS-20) (Bressi et al., 1996; Taylor et al., 2003). The subjects were asked to indicate the extent to which they agreed or disagreed with each statement on a five-point Likert scale. The results provide a TAS-20 total score, and three subscale scores that measure different aspects of alexithymia: difficulty identifying feelings (DIF), which measures the inability to distinguish specific emotions or between emotions and the bodily sensations of emotional arousal; difficulty describing feelings (DDF), which assesses the inability to verbalize one's emotions to other people; and externally-oriented thinking (EOT), which evaluates the tendency of individuals to focus their attention externally and not on the inner emotional experience (Lumley et al., 2007; Taylor et al., 2003). The TAS-20 cut-off scores are as follows: ≤51 no alexithymia, 52–60 borderline alexithymia, ≥61 alexithymia. This scale has shown good internal consistency and test-retest reliability, as well as convergent, discriminant and concurrent validity (Taylor and Bagby, 2004.), and is currently one of the most utilized instruments in the study of alexithymia.

Psychological assessment

The presence of depressive and anxiety symptoms was assessed using the Italian version of the Hospital Anxiety and Depression Scale (HADS) (Bjelland et al., 2002; Costantini et al., 1999). It consists of 14 items on a 0 to 3 range and is divided into two subscales, one for depression (HADS-D) and one for anxiety (HADS-A). Each subscale score ranges from 0 to 21, with a score of 8 or more suggesting a clinically relevant level of depression/anxiety symptoms (Zigmond and Snaith, 1983).

The level of emotional distress, i.e., the extent of distress that patients experienced over the last week, was measured using the Distress Thermometer (DT) (Roth et al., 1998; van Dooren et al., 2009). This

is composed of a scale ranging between 0 (No distress) and 10 (Extreme distress). A score equal to or greater than 4 indicates clinically relevant distress (Jacobsen et al., 2005).

Throughout the paper, the term "psychological distress" will be used with reference to depression, anxiety and emotional distress scales globally considered.

Statistical analyses

All the statistical analyses were conducted using IBM SPSS Statistics, version 22.0.

Normal distribution was assessed using indices of asymmetry and kurtosis. All variables resulted normally distributed. First, the total FM sample was divided into alexithymic and non-alexithymic groups on the basis of their total TAS-20 scores (total TAS-20 scores ≥61 and ≤51, respectively) (Taylor et al., 2003), and independent *t*-tests or X^2 tests for categorical data were used to compare the two groups.

Secondly, Pearson correlations were computed to evaluate the possible relationships between alexithymia and pain (pain experience and pain intensity), psychological variables (depression, anxiety and emotional distress), and demographical/clinical variables (age, educational level and duration of illness). Bonferroni correction for multiple testing was applied ($\alpha = .05/3$).

Thirdly, hierarchical multiple regression analyses were run to assess whether alexithymia was still a significant predictor of the different measures of pain when competing predictors (depression, anxiety and emotional distress) were controlled for. Pain measures were used as dependent variables. The predictor groups were entered into the regression model according to the following schema: potentially confounding variables (age, educational level and duration of illness), alexithymia, and competing predictors (depression, anxiety and emotional distress). The enter method was used to include the variables of the predictor groups.

To avoid unnecessary reductions in statistical power, confounding and competing predictors variables were included in the regression models only when they were significantly correlated with the dependent variables (p <0.017). Collinearity was assessed through the statistical factor of tolerance and Variance Inflation Factor (VIF).

Finally, the PROCESS macro 2.13 for SPSS developed by Andrew F. Hayes (2013) was used to test for possible statistical mediation of psychological variables in the relationship between alexithymia and pain (Baron and Kenny, 1986; MacKinnon et al., 2007).

Results

Descriptive data

The data on the demographic and clinical characteristics of FM sample are presented in **Table 1**.

With regard to the clinical characteristics, FM patients reported 88.9 (± 65.3) months of illness and a high rate of pain intensity (FIQ-Pain: 7.1 ± 2.5).

As far as the psychological assessment was concerned, FM patients showed a high prevalence of anxious-depressive symptoms, in line with previous studies (Castelli et al., 2012; Fietta et al., 2007). In particular, 57.5% of our patients reported a clinically relevant level of anxiety (HADS-A ≥ 8), while 63.1% reported a clinically relevant level of depression (HADS-D ≥ 8). A high prevalence of emotional distress (DT ≥ 4) was also found in 76.9% of the sample.

Finally, at TAS-20, FM patients reported a higher prevalence of alexithymia compared to the general population (Steinweg et al., 2011) (25.8% vs. 6-8%, respectively).

Differences between alexithymic and non-alexithymic groups

The comparisons between the alexithymic and non-alexithymic groups are shown in **Table 2**.

The two groups were matched for age (alexithymic group vs. non-alexithymic group, mean ± SD: 52.2 ± 10.1 vs. 52.3 ± 10.8; t(115) = 0.04, *p* = NS), educational level (10.1 ± 3.2 vs. 11.0 ± 3.2; t(114) = 1.37, *p* = NS), and duration of illness (106.8 ± 69.6 vs. 80.5 ± 57.6; t(97) = -1.97, *p* = NS).

The alexithymic group presented significantly higher scores on QUID-S (*p* = 0.007), QUID-A (*p* <0.001), FIQ-Pain (*p* <0.001), HADS-A (*p* <0.001), HADS-D (*p* <0.001), and DT (*p* <0.001), compared to the non-alexithymic one.

For descriptive purposes, comparisons between non-alexithymic vs. borderline and alexithymic vs. borderline FM patients were also performed. Borderline group showed significantly higher scores on HADS-A (borderline group vs. non-alexithymic group, mean ± SD: 9.8 ± 3.4 vs. 6.9 ± 3.7; t(116) = -4.24, *p* <0.001), HADS-D (10.2 ± 3.8 vs. 7.2 ± 3.8; t(116) = -4.07, *p* <0.001), and DT (6.3 ± 2.4 vs. 4.7 ± 2.8; t(116) = -3.14, *p* = 0.002), compared to non-alexithymic one. No significant differences emerged on the other measures. As far as the comparisons between alexithymic vs. borderline groups were concerned, alexithymic patients presented significantly higher scores on HADS-A (alexithymic group vs. borderline group, mean ± SD: 13.2 ± 3.7 vs. 9.8 ± 3.4; t(81) = -4.37, *p* <0.001), HADS-D (12.1 ± 3.1 vs. 10.2 ± 3.8; t(81) = -2.53, *p* = 0.013), DT (7.7 ± 1.6 vs. 6.3 ± 2.4; t(72.4) = -3.16, *p* = 0.002), FIQ-Pain (8.6 ± 1.8 vs. 6.9 ± 2.6; t(71.7) = -3.23, *p* = 0.002) and QUID-A (0.5 ± 0.2 vs. 0.4 ± 0.2; t(80) = -2.91, *p* = 0.005), compared to borderline ones. No significant differences emerged on the other measures.

Correlation Analyses

The results of the bivariate correlations are presented in **Table 3**. Higher scores on alexithymia total score and alexithymia DIF and DDF factors were all positively correlated with the affective dimension of pain experience (QUID-A), pain intensity (FIQ-Pain), and the three measures of psychological distress (depression, anxiety and emotional distress). No correlations were found between the EOT factor of the TAS-20 and pain variables, or between other alexithymia scores and the sensory dimension of pain experience, age, educational level, and duration of illness.

Multiple regressions

To investigate whether alexithymia was still a significant predictor of pain after controlling for competing predictors (depression, anxiety and emotional distress), two hierarchical multiple regression analyses were performed. The affective class of QUID was used as a dependent variable in the first regression, while the FIQ-Pain was used in the second one. Since the variables of age, educational level and duration of illness did not correlate with the dependent variables, they were no longer included in the regression analyses.

With regard to the QUID-A, the alexithymia DIF factor ceased to uniquely predict affective pain with the introduction of psychological variables, specifically anxiety, to the model (**Table 4**).

The full model of alexithymia, anxiety, depression and emotional distress to predict affective dimension of pain experience (Model 2) was statistically significant, $R^2 = .18$, $F(6, 151) = 5.38$, $p < 0.001$; adjusted $R^2 = .14$. In this case, anxiety ($\beta = 0.27$, $p = 0.039$) was the unique contributor of the final model.

Whereas as far as the FIQ-Pain is concerned, the initial model (Model 1) of alexithymia (DIF and DDF factors, and total score) to predict pain intensity was statistically significant, $R^2 = .09$, $F(3, 153) = 5.07$, $p = .002$; adjusted $R^2 = .07$ (**Table 5**). However, none of the alexithymia variables appeared to significantly contribute to explanation of the FIQ-Pain. The introduction of anxiety, depression and emotional distress gave an additional significant contribution to the model (Model 2), $R^2 = .23$, $F(6, 150) = 7.56$, $p < 0.001$; adjusted $R^2 = .20$. Nevertheless, emotional distress ($\beta = 0.28$, $p = 0.009$) was the unique significant predictor in the final model.

In both regression analyses, the statistical factor of tolerance and VIF showed that there were no interfering interactions between the variables.

Overall, the results of the two hierarchical regressions showed a significant predictor role of the DIF factor in explaining the QUID-A, which was no longer present after controlling for psychological distress, in particular for anxiety. Whereas none of the alexithymia variables resulted significant in explaining the variance of the FIQ-Pain.

Mediation analysis

The results of the hierarchical regression analyses showed a significant contribution of the alexithymia DIF factor in explaining the affective dimension of pain experience (QUID-A) which was no longer present after controlling for psychological distress, in particular for anxiety. Based on these results, we hypothesized a mediation role of anxiety in the relationship between alexithymia and affective pain. A mediation analysis was therefore computed in order to verify the effect of HADS-A in mediating the relationship between DIF factor of TAS-20 and QUID-A.

This hypothesis was confirmed, finding a significant indirect effect of DIF on QUID-A through the HADS-A, $b = 0.01$, BCa CI [0.003, 0.01], Z = 3.43, $p = <0.001$. The effect size of the indirect effect was medium $\kappa^2 = .17$, 95% BCa CI [0.094 , 0.272] (it should not be forgotten that small effect size $\kappa^2 = .01$; medium effect size $\kappa^2 = .09$; large effect size $\kappa^2 = .25$) (**Figure 1**).

Discussion

The present study aimed to shed light on the relationship between alexithymia and pain in a sample of FM patients. To reach this goal, the following specific objectives were addressed. First, we evaluated the differences between alexithymic and non-alexithymic subgroups of FM patients on pain (pain experience and pain intensity) and psychological distress (anxiety, depression and emotional distress). Secondly, we investigated whether alexithymia was a predictor of pain measures beyond the effect of psychological distress, and the possible mediation role of the latter in the relationship between alexithymia and affective pain.

To the best of our knowledge, this is the first study comparing alexithymic and non-alexithymc subgroups of FM patients. Our results highlighted a significant difference between the two groups in all the clinical measures. In particular, alexithymic FM patients showed significantly higher levels of pain intensity, pain experience (on both the affective and sensory dimensions), anxiety, depression and emotional distress. At the same way, alexithymic FM patients presented significantly higher scores in all the clinical measures (except for the QUID-S) when compared to borderline ones. Conversely, borderline FM patients showed significantly higher levels of anxiety, depression and emotional distress with respect to non-alexithymic ones.

These data are in line with previous studies which compared alexithymic and non-alexithymic samples of chronic pain sufferers, finding that alexithymic individuals reported significantly higher scores on pain and psychological distress compared to non-alexithymic ones (Makino et al., 2013; Saariaho et al., 2013).

A possible explanation for these results could be that individuals who display alexithymic trait at a clinical or subclinical level have not only limited abilities to process their emotions, but also great difficulty in expressing psychological distress, resulting in a failure to enlist the aid or comfort of other people (Taylor et al., 1997). This could lead to increased emotional distress and greater levels of depression and anxiety. Moreover, alexithymia may contribute to increasing the disability caused by the FM syndrome, making individuals unable to adequately regulate and process their own emotions. This could lead FM patients to wrongly interpret their emotional arousal as a sign of disease and to seek medical care for symptoms for which there is no clear medical explanation (Lumley et al., 1996; Tuzer et al., 2011).

As far as the second goal of this study is concerned, we analyzed the relationship between alexithymia and pain measures, controlling for psychological distress. Regarding the sensory component of pain, no correlation was found between the QUID-S and alexithymia. In the same way, an initial positive correlation found between FIQ-Pain and alexithymia was not supported by the regression analysis. The presence of emotional distress was, in fact, the only predictor that mainly explained the variance of FIQ-Pain, demonstrating a non-significant role of alexithymia variables or other psychological measures (anxiety and depression) in accounting for pain intensity. Whereas with regard to the affective dimension of pain experience, a different pattern of results was found. In this case, alexithymia, in particular difficulty in the identifying feelings factor, ceased to be a significant predictor of QUID-A, when psychological variables were introduced to the model. These data are in line with previous findings which have shown an association exclusively between alexithymia and the affective dimension of pain, both in FM (Huber et al., 2009) and in other chronic pain conditions (Lumley et al., 2002). Indeed, investigating the relationship between alexithymia and the affective/sensory dimensions of ongoing pain in a group of FM patients, Huber et al. (2009) found that alexithymia, in particular the DIF factor, was positively related only to the affective dimension of ongoing pain and not to the sensory one. However, this association became not significant when psychological distress or illness behavior was independently controlled for. In the same way, Lumley et al. (2002) analyzed whether alexithymia was related to the affective, but not the sensory component of pain, beyond the effect of self-efficacy, catastrophizing, and depression, in a sample of patients with chronic myofascial pain. They found that alexithymia was positively related only to the affective dimension of pain. Nevertheless, this association remained significant only after controlling for self-efficacy and catastrophizing, while depression accounted for alexithymia's relationship with affective pain.

Although these studies highlighted a selective association between alexithymia and the affective dimension of pain, they did not examine in depth the specific effect of psychological distress in the

relationship between alexithymia and affective pain. In particular, Huber et al. (2009) performed a mediation analysis taking into account the overall general distress and not the specific components (i.e. anxiety, depression) as mediator variables, while Lumley et al. (2002), although hypothesizing a mediation role of depression in the relationship between alexithymia and affective pain, did not perform a mediation analysis to verify it.

Going further with these studies, we ran a mediation analysis, finding that the relationship between alexithymia and affective pain was specifically mediated by anxiety, and not by depression as suggested by previous works (Huber et al., 2009; Lumley et al., 2002; Malt et al., 2002). It can be speculated that alexithymia interferes with adequate emotion regulation processes, resulting in increased negative affects such as anxiety, which in turn may influence the affective dimension of pain experience. In addition, it is worth noting that the DIF factor of TAS-20, which accounted for alexithymia's relationship with anxiety and affective pain, deals specifically with emotion processing abilities. These results suggest that the affective rather than the cognitive/attentional (i.e. EOT subscale) facets of alexithymia may influence the affective dimension of pain experience. From a neurological standpoint, the affective component of pain is regulated through a specific brain structure, the limbic system, which plays a crucial role also in emotional processing skills. In addition, there is evidence in FM patients of structural and functional alterations in brain areas (i.e. the amygdala and insula), crucial for both emotional processing abilities and affective pain experience (Burgmer et al., 2009; Gracely and Ambrose, 2011). Neuroimaging data could thus be useful to support and verify the specific relationship between alexithymia, anxiety and affective pain.

Limitations

The present study has some limitations that should be considered. First, cross-sectional studies do not allow certain conclusions about causal direction to be drawn. Longitudinal studies on chronic pain patients are needed to better clarify whether alexithymia contributes to increased psychological distress and pain, or whether psychological distress impacts negatively on alexithymia and other variables.

Secondly, the use of self-reported instruments might have led to underestimation of, for example, the presence of frank alexithymic traits in individuals falling into borderline cut-off scores. Paradoxically, explicit self-report measures require the respondents to be aware of their reduced ability to identify and describe feelings (Parling et al., 2010). Performance-based instruments or structured interviews, less dependent on the patient's awareness, should be employed in addition to traditional self-reported measures.

Finally, a control group of patients was not included. Future studies should compare FM sufferers to patients with other chronic pain conditions, such as rheumatoid arthritis – a chronic pain pathology with a low psychosomatic component – in order to verify the specificity of the results.

Conclusions

The findings reported in the current study highlight the presence of higher levels of pain symptoms and psychological distress in alexithymic FM patients compared to non-alexithymic ones. Furthermore, our results show an association between alexithymia, in particular difficulty in identifying feelings, and the affective dimension of pain experience, supporting the idea that in patients with chronic muscular pain alexithymia is mainly related to the unpleasant component of pain, rather than the sensory one. What is more, we found that this relationship is specifically mediated by anxiety, suggesting that alexithymia could lead to more affective pain via increases in anxiety levels.

Taken together, these results indicate that adequate assessment of alexithymia and psychological distress, in particular of anxiety, may enhance understanding of the affective symptoms of pain in FM patients. Consideration of both physical and psychological aspects could allow clinicians to plan better-tailored treatments specific for each patient's needs.

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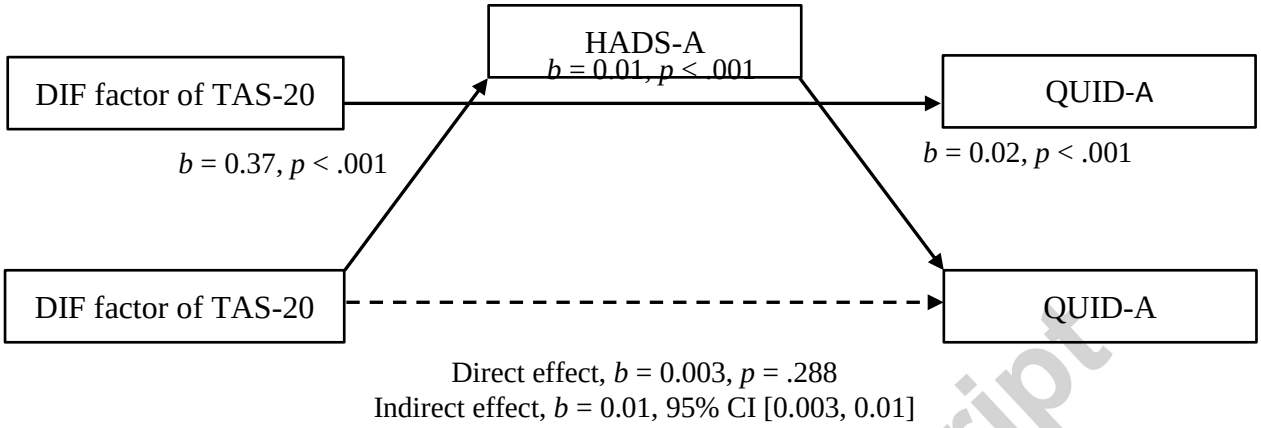

Figure 1. Model of alexithymia (DIF factor of TAS-20) as a predictor of affective pain (QUID-A), mediated by anxiety (HADS-A). The confidence interval for the indirect effect is a BCa bootstrapped CI based on 1,000 samples.

Table 1. Demographic and clinical characteristics of the FM patients (N = 159).

	Mean (SD)	n (%)	Range
Age	52.5 (10.2)		24-74
Years of education	10.5 (3.3)		5-18
Duration of illness (months)	88.9 (65.3)		0-288
Pain			
QUID-S	0.3 (0.1)		0-1
QUID-A	0.4 (0.2)		0-1
FIQ-Pain	7.1 (2.5)		0-10
Psychological Distress			
HADS-A	9.2 (4.5)		0-21
HADS-D	9.2 (4.2)		0-21
DT	5.9 (2.8)		0-10
Alexithymia			
TAS-20 Total	51.6 (13.3)		0-100
Non-alexithymic		76 (47.8)	
Borderline		42 (26.4)	
Alexithymic		41 (25.8)	

TAS-20 DIF	20.1 (7.3)	0-35
TAS-20 DDF	13.4 (4.8)	0-25
TAS-20 EOT	18.1 (5.0)	0-40

QUID-S and QUID-A = Sensory and Affective classes of *Questionario Italiano sul dolore*; FIQ-Pain = item "Pain" of the Fibromyalgia Impact Questionnaire; HADS-A and HADS-D = Anxiety and Depression subscales of the Hospital Anxiety; DT = Distress Thermometer; TAS-20 = Twenty-item Toronto Alexithymia Scale; TAS-20 DIF = Difficult Identifying Feelings factor of Toronto Alexithymia Scale; TAS-20 DDF = Difficulty Describing Feelings factor of Toronto Alexithymia Scale; TAS-20 EOT = Externally-Oriented Thinking factor of Toronto Alexithymia Scale.

Table 2. Comparisons between alexithymic and non-alexithymic groups.

		Alexithymic Group (N = 41)	**Non-alexithymic Group (N = 76)**	**Test (df)**	***p***
QUID-S	**Mean (SD)**	0.4 (0.1)	0.3 (0.1)	t(115) = -2.73	**.007**
QUID-A	**Mean (SD)**	0.5 (0.2)	0.3 (0.2)	t(115) = -3.73	**<.001**
FIQ-Pain	**Mean (SD)**	8.6 (1.8)	6.4 (2.3)	t(114) = -5.05	**<.001**
HADS-A	**Mean (SD)**	13.2 (3.7)	6.9 (3.7)	t(115) = -8.91	**<.001**
	n (%) (≥8)	37 (90.2)	26 (34.2)	$X^2(1) = 33.65$	**<.001**
HADS-D	**Mean (SD)**	12.1 (3.1)	7.2 (3.8)	t(96.82) = -7.52	**<.001**
	n (%) (≥8)	37 (90.2)	32 (42.1)	$X^2(1) = 25.51$	**<.001**
DT	**Mean (SD)**	7.7 (1.6)	4.7 (2.8)	t(114.45) = -7.37	**<.001**
	n (%) (≥4)	40 (97.6)	48 (63.2)	$X^2(1) = 16.91$	**<.001**

QUID-S and QUID-A = Sensory and Affective classes of *Questionario Italiano sul dolore*; FIQ-Pain = item "Pain" of the Fibromyalgia Impact Questionnaire; HADS-A and HADS-D = Anxiety and Depression subscales of the Hospital Anxiety and Depression Scale; DT = Distress Thermometer.

Table 3. Pearson correlations between pain, alexithymia and psychological measures (*N* = 159).

	1	**2**	**3**	**4**	**5**	**6**	**7**
1. QUID-A	–						
2. FIQ-Pain	.25**						
3. HADS-A	.41**	.42**					
4. HADS-D	.35**	.37**	.73**				

5. DT	.35**	.43**	.70**	.64**			
6. TAS-20 Total	.26**	.29**	.60**	.52**	.46**		
7. TAS-20 DIF	.31**	.28**	.61**	.54**	.50**	.85**	
8. TAS-20 DDF	.20*	.25**	.49**	.38**	.39**	.82**	.58**

QUID-S and QUID-A = Sensory and Affective classes of *Questionario Italiano sul dolore*; FIQ-Pain = item "Pain" of the Fibromyalgia Impact Questionnaire; HADS-A and HADS-D = Anxiety and Depression subscales of the Hospital Anxiety and Depression Scale; DT = Distress Thermometer; TAS-20 = Twenty-item Toronto Alexithymia Scale; TAS-20 DIF = Difficult Identifying Feelings factor of Toronto Alexithymia Scale; TAS-20 DDF = Difficulty Describing Feelings factor of Toronto Alexithymia Scale.

* $p<.017$; ** $p<.01$

Table 4. Hierarchical multiple regression predicting affective dimension of pain experience (QUID-A) from alexithymia, anxiety, depression and emotional distress ($N = 159$).

Predictor variables	**B**	**β**	**t**	**R^2**	**F**	**ΔR^2**	**ΔF**
Model 1				0.09	5.35**	0.09	5.35**
TAS-20 Total	-0.001	-0.03	-0.15				
TAS-20 DIF	0.009	0.31	1.99*				
TAS-20 DDF	0.002	-0.04	0.28				
Model 2				0.18	5.38**	0.08	4.99**
TAS-20 Total	-0.001	-0.07	-0.31				
TAS-20 DIF	0.004	0.14	0.89				
TAS-20 DDF	-0.001	-0.02	-0.14				
HADS-A	0.013	0.27	2.08*				
HADS-D	0.003	0.05	0.45				
DT	0.007	0.09	0.86				

TAS-20 = Twenty-item Toronto Alexithymia Scale; TAS-20 DIF = Difficult Identifying Feelings factor of Toronto Alexithymia Scale; TAS-20 DDF = Difficulty Describing Feelings factor of Toronto Alexithymia Scale; HADS-A and HADS-D = Anxiety and Depression subscales of the Hospital Anxiety and Depression Scale; DT = Distress Thermometer.

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

Table 5. Hierarchical multiple regression predicting pain intensity (FIQ-Pain) from alexithymia, anxiety, depression and emotional distress (*N* = 159).

Predictor variables	B	β	t	R^2	F	ΔR^2	ΔF
Model 1				0.09	5.07**	0.09	5.07**
TAS-20 Total	0.007	0.40	0.18				
TAS-20 DIF	0.059	0.18	1.12				
TAS-20 DDF	0.061	0.12	0.84				
Model 2				0.23	7.56**	0.14	9.23**
TAS-20 Total	0.006	0.32	0.15				
TAS-20 DIF	-0.019	-0.06	-0.37				
TAS-20 DDF	0.019	0.04	0.28				
HADS-A	0.102	0.18	1.49				
HADS-D	0.043	0.07	0.67				
DT	0.246	0.28	2.65**				

TAS-20 = Twenty-item Toronto Alexithymia Scale; TAS-20 DIF = Difficult Identifying Feelings factor of Toronto Alexithymia Scale; TAS-20 DDF = Difficulty Describing Feelings factor of Toronto Alexithymia Scale; HADS-A and HADS-D = Anxiety and Depression subscales of the Hospital Anxiety and Depression Scale; DT = Distress Thermometer.

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

Highlights

- The relationship between alexithymia and pain was investigated in 159 FM patients.
- Alexithymic (vs. non-alexithymic) FM patients showed higher pain and distress levels.
- Alexithymia positively correlated with the affective (not sensory) component of pain.
- Anxiety significantly mediated the association between alexithymia and affective pain.