

# Alexithymia and psychological distress in fibromyalgia and chronic migraine: A cross-sectional study

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## ABSTRACT

**Objective:** Several studies have shown a strong association between alexithymia and psychological distress in both healthy and clinical populations. The aim of this study was to investigate the prevalence and association between alexithymia and psychological distress in individuals with fibromyalgia (FM) and chronic migraine (CM) compared with healthy controls (HC).

**Methods:** A cross-sectional study was conducted. Two hundred fifty women with FM (age:  $51.2 \pm 10.5$ ) and 250 women with CM (age:  $46.1 \pm 11.5$ ) were assessed with the Toronto Alexithymia Scale (TAS-20) and the Hospital Anxiety and Depression Scale (HADS) and compared with HCs ( $n = 280$ ; age:  $51.8 \pm 9.0$ ) by one-way analyses of variance. A moderation analysis was performed to examine the moderation effect of groups on the relationship between alexithymia and psychological distress.

**Results:** Differences between groups showed significantly higher scores for TAS-20 [ $F(2,755) = 11.7, p < .001$ ] and HADS [ $F(2,763) = 31.7, p < .001$ ] in FM, compared with CM and HCs. The moderation analysis showed that both clinical groups and TAS-20 ( $\beta = 0.20, p < .001$ ) were significant predictors, as well as the interaction terms. The slope of the correlation curve was more pronounced in the patient groups, indicating that the degree of alexithymia had a significantly higher influence on the HADS total score in the patient groups.

**Conclusion:** The results suggest a common psychological dysregulation in FM and CM, with a slight but greater prevalence of alexithymia and psychological distress in FM. These data suggest that although there is a similar psychological substrate, it is expressed in a different expression of somatic symptoms.

## 1. Introduction

Chronic pain (CP) is a condition that affects the social, physical, and emotional functioning of people who suffer from it [1]. To provide care to these patients, it is important to consider the psychosocial factors involved in the genesis and maintenance of these conditions, that are common to several CP disorders [2]. Among these, alexithymia is very common [9]; many studies have demonstrated that alexithymic individuals have high body awareness that leads them to perceive somatic

sensations and focus on them, magnifying them and generating a feedback loop. As a result, patients often attribute these sensations to biological rather than psychological causes. In CP, the diminished ability to name and describe emotions causes physiological correlates of emotions to be misinterpreted as signs of illness [3]. At the same time, alexithymia is often associated with increased psychological distress (anxiety and depressive symptoms). Emotional awareness is important for effective emotion regulation, and the experience of CP contributes to additional stress in many domains of life, leading to the development of negative

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mental health outcomes [1,3].

In the field of CP, fibromyalgia (FM) and chronic migraine (CM) are two of the most common conditions. FM is a syndrome characterized by widespread CP in multiple areas of the body, with an aggregation of other symptoms such as fatigue, distress, and cognitive disorders [4–6], with a high prevalence of psychological/psychiatric conditions [7,8]. On the side of migraine, similar conditions are shown, with a significant proportion developing CM [4]. The pathophysiology of CM is still unclear, but it can probably be considered a threshold disorder in which certain predisposing factors, including depression and stressful life events, may lower the threshold for migraine attacks and thus increase the risk of CM [5].

Only few studies examined alexithymia and psychological distress in CM [9–12]. Although the comorbidity of headache in FM or vice versa has been previously investigated [13,14], to date, no studies have comparatively analyzed alexithymia and psychological distress in FM and CM. It could be expected that FM and CM should present similar psychological profiles [15].

Aim of this cross-sectional study was to investigate the prevalence and severity of psychological distress and alexithymia in FM and CM, by comparing them with healthy control (HC) in a cross-sectional design study.

## 2. Materials and methods

This study has been conducted from 2019 to 2021. Due to the high prevalence of FM and CM in women and to avoid sex-related effects, only women were enrolled. Diagnosis for FM was made by expert rheumatologists [16,17]; for CM it was made by expert neurologists according to international classification [18]. The exclusion criteria for the three groups were as follows: (a) under 18-year-old, (b) low educational level (under 5 years), (c) severe psychiatric disorders, (d) severe medical (e.g., cancer) or psychosomatic conditions (including psoriasis, Crohn's disease, or chronic low back pain), and (e) a history of neurological disorders for FM and HCs, a history of other neurological disorders besides migraine for CM, and a history of CP for the HCs. In addition, none of the FM reported a diagnosis of CM in their medical history and vice versa.

All patients were consecutively recruited: 250 with FM at the Fibromyalgia Integrated Outpatient Unit (Hospital of Turin, Italy) and 250 with CM at the Headache Science and Neurorehabilitation Center Mondino Foundation, Pavia (Italy). A group of 280 HCs was also recruited. The study was approved by the ethical committees of the participating institutions. All participants provided informed written consent. All participants were assessed for alexithymia using the Toronto Alexithymia Scale (TAS-20) [19] and for psychological distress by the Hospital Anxiety and Depression Scale (HADS) [20].

### 2.1. Statistical analysis

Alexithymia levels (TAS-20 scores) was considered as primary outcome, while psychological distress (HADS scores) as secondary outcome.

Statistical analyses were performed using the Statistical Package for Social Science, version 27.0. The indices of asymmetry and kurtosis were used to test the normality of the data. Comparisons between the groups were performed using Student's *t*-test or one-way analyses of variance (ANOVAs), followed by the Tukey post-hoc analysis; effect size was determined by calculating partial eta-squared ( $\eta^2$ ).

A moderation model of regression analyses, using the PROCESS MACRO 3.5 for SPSS, was run to test the moderation effect of the groups on the relationship between alexithymia and psychological distress. The HADS total score was used for its adequate reliability, as previously confirmed [21].

The HC group was used as a reference for the two clinical groups. Moderation was tested using the HADS total score as the dependent

**Table 1**

Socio-demographic and psychological variables of the three groups. Mean (SD) or percentage, ANOVA (F) or *t*-test for independent samples (t) results are listed.

|                        | FM<br>group<br>N = 251    | CM<br>group<br>N = 250    | HC<br>group<br>N = 280   | Test (df)          | <i>p</i> -value |
|------------------------|---------------------------|---------------------------|--------------------------|--------------------|-----------------|
| Age (y)                | 51.2 ± 10.5*              | 46.1 ± 11.5* <sup>+</sup> | 51.8 ± 9.0 <sup>+</sup>  | F(2,762.1) = 23.21 | <0.001          |
| Education (y)          | 11.4 ± 3.4* <sup>+</sup>  | 12.9 ± 3.9 <sup>+</sup>   | 12.9 ± 3.6 <sup>+</sup>  | F(2,758) = 13.95   | <0.001          |
| VAS Pain (0–10)        | 7.2 ± 2.3*                | 7.5 ± 1.1*                | –                        | t(346.01) = –2.11  | 0.037           |
| Alexithymia            |                           |                           |                          |                    |                 |
| TAS-20 Total score     | 51.3 ± 13.5* <sup>+</sup> | 48.1 ± 13.3* <sup>+</sup> | 45.7 ± 12.6 <sup>+</sup> | F(2, 755) = 11.68  | <0.001          |
| TAS-20 DIF             | 20.3 ± 7.2* <sup>+</sup>  | 16.8 ± 7.3* <sup>+</sup>  | 14.5 ± 6.5 <sup>+</sup>  | F(2,763) = 38.77   | <0.001          |
| TAS-20 DDF             | 13.4 ± 5.0                | 12.7 ± 5.0                | 12.5 ± 4.5               | F(2,766) = 2.34    | 0.097           |
| TAS-20 EOT             | 17.6 ± 4.9                | 18.5 ± 4.8                | 18.3 ± 5.1               | F(2, 766) = 1.82   | 0.164           |
| Psychological distress |                           |                           |                          |                    |                 |
| HADS Total score       | 18.3 ± 8.0* <sup>+</sup>  | 15.6 ± 8.1* <sup>+</sup>  | 13.0 ± 6.5 <sup>+</sup>  | F(2,765) = 31.75   | <0.001          |
| HADS Anxiety           | 9.1 ± 4.5* <sup>+</sup>   | 7.9 ± 4.1* <sup>+</sup>   | 6.7 ± 3.7 <sup>+</sup>   | F(2,767) = 22.88   | <0.001          |
| HADS Depression        | 9.1 ± 4.3* <sup>+</sup>   | 7.7 ± 4.7* <sup>+</sup>   | 6.3 ± 3.7 <sup>+</sup>   | F(2,767) = 29.90   | <0.001          |

Note: FM: fibromyalgia; CM: chronic migraine; HC: healthy controls. VAS: Visual Analogue Scale; TAS-20: 20-item Toronto Alexithymia Scale, DIF: difficulty in identifying feelings, DDF: difficulty in describing feelings, EOT: externally-oriented thinking; HADS: Hospital Anxiety and Depression Scale. \*Significant differences between FM and CM; <sup>+</sup>significant differences between FM and HC; <sup>°</sup>significant differences between HC and CM.

variable: alexithymia and group were entered in the first step, and the two multiplicative terms representing the interaction between group and alexithymia were added in the second step. The level of significance for all statistical tests was set at  $p < .05$ .

The sample size was calculated on the primary outcome, based on the data reported in previous studies [6,10]. Under the assumption that FM and CM do not significantly differ, instead, they differ from the HC group, a minimum sample size of 102 subjects per group was obtained considering a 95% of power (two-sided test) and a Bonferroni corrected alpha of 0.02.

## 3. Results

### 3.1. Psychological data

With regard to alexithymia, we found that 25% FM, 20% of CM, and 12% of the HC was alexithymic (TAS-20 total score  $\geq 61$ ). Moreover, the ANOVA revealed that there was a significant effect of groups on the TAS-20 total score and on the TAS-20 DIF subscale. A post-hoc Tukey test showed that patients with FM reported higher TAS-20 total scores compared to CM and HC. Furthermore, the HC reported lower TAS-20 DIF scores than FM and CM.

Regarding psychological distress, 62.2% of patients with FM showed clinically relevant levels of psychological distress (HADS total score  $> 14$ ; [22]), compared to 50.4% of CM and 40% of HC. ANOVA results showed a significant effect of group on HADS total. Post-hoc Tukey tests showed that patients with FM reported significantly higher means compared to CM and HCs (Table 1). Box plots for differences between groups in HADS and TAS-20 scores are available (Appendix A, Supplementary Material).

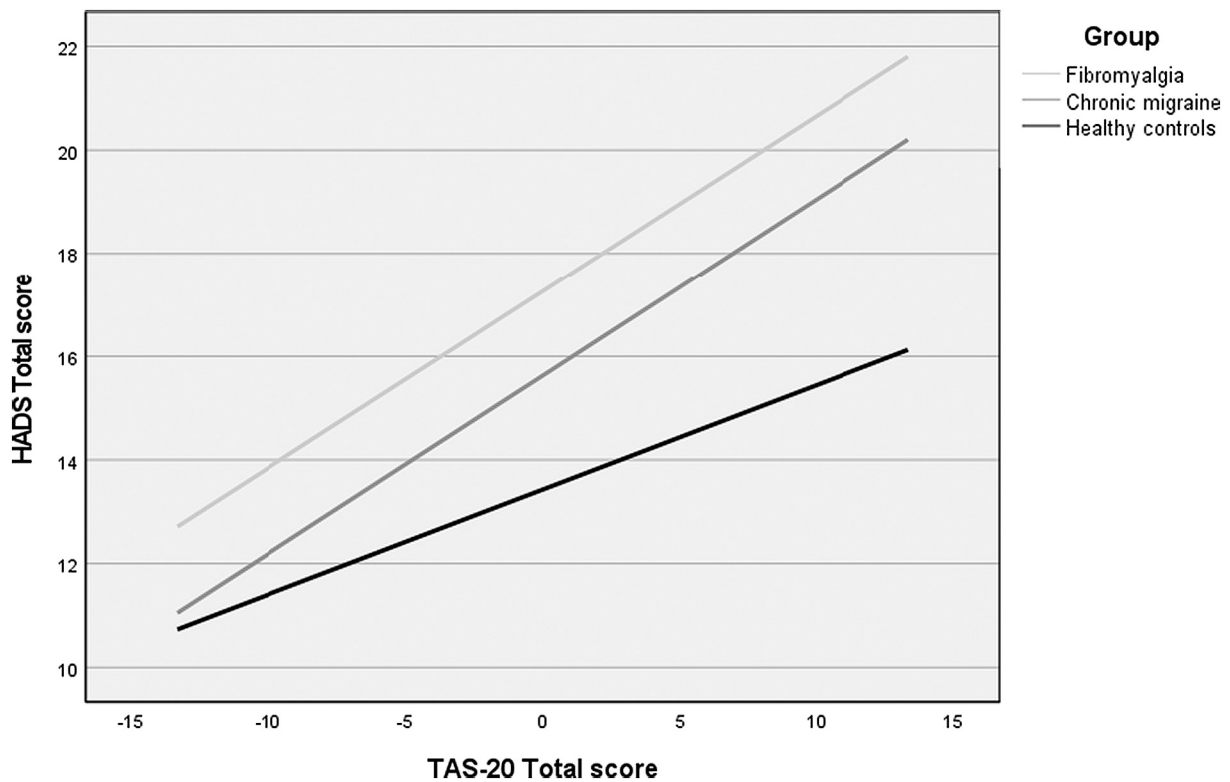


Fig. 1. Illustration for the moderation effect of groups (FM-CM-HC) in the relationship between alexithymia (TAS-20 Total score) and psychological distress (HADS Total score).

### 3.2. Moderation analysis

A hierarchical multiple regression analysis was performed to examine whether adding the interaction terms (TAS-20  $\times$  group) to the regression models may act as a moderator in the relationship between alexithymia and distress. The final model explained a significant amount (34%) of psychological distress [ $F(5,748) = 76.20, p < .001$ ]. Significant predictors were both clinical groups (CM vs. HC,  $\beta = 0.34, p < .001$ ; FM vs. HC,  $\beta = 0.34, p < .001$ ) and TAS-20 total score ( $\beta = 0.20, p < .001$ ), as well as the interaction terms ( $p = .001$ ). The slope of the correlation curve was more pronounced in the clinical groups (Fig. 1), suggesting that the level of alexithymia had a significantly higher influence on the HADS total score in the clinical groups.

## 4. Discussion

We found significantly higher levels of alexithymia in FM than CM and HCs, even if the two clinical groups were similar – and had higher scores than HCs – in terms of difficulty in identify feelings. Such a finding is consistent with the current literature [9,10], where such difficulties are emphasized in FM [3,23]. This is in line with studies hypothesizing that psychological components may be higher in FM than in other CP conditions [24,25].

Our results confirmed previous research, which found a high prevalence of psychological factors in CP [26]. Specifically, the FM group reported significantly higher levels of psychological distress, with nearly two out of three patients reporting values above the cut-off of the HADS scale, even when compared with CM. Regarding CM, our data confirmed previous findings [27]: psychological distress is frequently observed in CM, where it seems to play a role in the progression towards chronicity, with particular relevance given by the anxiety component [28].

Interestingly, the disorders played a significant role in moderating psychological distress. This suggests that, in addition to the presence of a significant influence of alexithymia on distress, this effect is reinforced

in the two disorders compared with the HCs. Although FM and CM have different clinical manifestations, several studies have confirmed the presence of psychological symptoms in both conditions, often associated with higher pain intensity and worse perception of general health [29,30].

Some limitations must be considered when interpreting these results. In addition to the cross-sectional design, it must be added that although none of the FM had given a diagnosis of CM in their medical history and vice versa, we cannot exclude this possibility because of the strong association between these two conditions.

In conclusion, it is well known that the difficulty in regulating emotions, typical of people with alexithymia, leads to an increase in negative affect, which may promote the development or exacerbation of somatic disorders. On the other hand, people with alexithymia tend to exacerbate somatic correlates related to emotional activation and misinterpret them as symptoms of a physical illness. This, in turn, is often accompanied by marked psychological distress, a relationship that appears to be stronger in FM and CM.

In the clinical setting, identification and treatment of these factors is critical, as they may influence the course of the disease itself and, in particular, response and adherence to treatment [31,32]. Indeed, clinical trials examining the effects of psychotherapeutic treatment directed at alexithymia are needed. This approach could be important not only to reduce anxiety and/or depressive symptoms, but also to help patients achieve a better perception of pain by being able to distinguish emotional states from physical sensations.

### Ethic approval and patient consent

The study was approved by the local Ethics Committee and written informed consent was obtained from all patients. This study was carried out according to the Declaration of Helsinki.

## Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: [Zenodo: 10.5281zenodo.5946822].

## Declaration of Competing Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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