

Anger in Fibromyalgia Syndrome

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Anger is considered one of the basic emotions together with fear, disgust, sadness, happiness, and surprise. Fibromyalgia syndrome (FMS) is one of the prototypical chronic pain conditions. Anger has been associated with increased pain perception, but its specific connection with FMS has not yet been established in an integrated approach. Anger might be a meaningful therapeutic target in the attenuation of pain sensitivity, and the improvement of the general treatment effects and health-related quality of life in FMS patients.

fibromyalgia syndrome

anger

pain

intervention

health-related quality of life

1. Introduction

Anger may be both, a state and a personality trait ^{[1][2]}. Furthermore, anger is mainly expressed in two basic dimensions: anger towards others or outside (also called anger-out), and anger towards oneself or within (which is also known as anger-in, anger turned inward, or unexpressed anger). On purpose, these two basic dimensions have been deeply studied in relation to anger management (i.e., as anger-in (the tendency to repress anger when it is experienced) and anger-out (the leaning to express anger through verbal or physical forms)) ^[3], and the sensitivity to both, acute and chronic pain ^[4].

Related to the neurological correlates of anger, several brain structures have been involved in both anger and aggression, including those related with emotion regulation (i.e., the amygdala) ^{[1][5]}. For instance, studies focus on human brain imaging have reported greater activity in anterior cingulate cortex and orbitofrontal cortex when individuals are asked to recall past experiences that made them feel angry ^{[5][6]}. Historically, studies of anger and aggression have been conducted to explore the involvement of subcortical structures in emotion ^[1]. Among these structures, the hypothalamus has been one of the earliest and leading associated to anger and aggressive behavior, and based on it a neural circuit for anger and aggression has been frequently proposed ^[1].

In addition, the neurotransmitter serotonin has also been proposed to play a relevant role in the regulation of anger and aggression ^{[1][6]}. In fact, the serotonin deficiency hypothesis (that is, the causal role of diminished serotonin in anger and aggression) is widely supported by the scientific evidence. This evidence shows clearly that aggression is inversely related to serotonergic activity ^{[1][5]}.

Chronic pain patients usually experience anger ^{[7][8]}. Nonetheless, it tends to be underestimated due to the denial and negative social connotation of this emotion ^[9], especially in women ^[10]. A possible explanation for anger denial

can be related to the social norms and religious values which are assumed to repress its expression [11]. Chronic pain patients, compared to healthy controls, have frequently reported higher levels of anger suppression and/or hostility, which in turn have been related to increased pain and disability [7][8][12].

One of the prototypical chronic pain conditions is fibromyalgia syndrome (FMS), which is characterized by generalized and persistent non-inflammatory musculoskeletal pain. Accompanying symptoms frequently comprise depression, anxiety, fatigue, insomnia, morning stiffness, and cognitive impairments (i.e., memory and attention problems, concentration difficulties, mental slowness, etc.) [13][14]. Moreover, a high percentage of FMS patients generally exhibited negative affect, which encompass alexithymia, catastrophizing, neuroticism [15][16][17][18] and deficit in health-related quality of life [16][17][19]. Its prevalence is established at 2 to 4% in the general population, and seems to be more frequent in women than in men [13]. However, recent studies reveal a possible gender bias which leads healthcare professionals to overestimate FMS prevalence in women simultaneously is underestimated in men [20][21]. Nowadays, there is not a specific treatment for FMS.

2. FMS and Anger

2.1. Anger in the Context of Personality Research

A predominant coping style of avoidance and anger, especially a high state anger and anger-in, was found in chronic pain patients [22]. In the same line, anger-in tend to be higher in FMS patients in comparison with healthy participants [19][23][24][25] and rheumatoid arthritis (RA) patients [23]. On purpose, anger-in and the anxiety scores foretold the level of pain severity in FMS patients [23]. However, it is interesting to note that in spite of anger-in is higher in patients who suffer from FMS, it is the behavioral expression of anger, along with anxiety, which predicts the pain severity in these patients [23].

Related to personality patterns, chronic patients seem to share some similar personality traits [22]. Several authors state that FMS patients do not significant differ from the other chronic pain patient groups (i.e., chronic lower back pain and RA patients) on personality traits [22]. In the case of anger as personality trait, anger seems not to be a characteristic personality trait in FMS patients [22].

2.2. The Association between Anger and Other Relevant Variables in FMS

On the other hand, different researches studied the relationships between anger and clinical, emotional and/or physiological variables. In the physiological aspect, Shelley-Tremblay et al. [24] observed that FMS patients exhibited greater levels of depression and anger, among other indicators of distress as well as increased relative left-frontal activation (rLFA) than healthy participants. An association between anger and increased rLFA has been also suggested [24].

Altogether, anger and sadness seem to amplify pain in women with and without FMS [26]. In fact, a stronger emotion-induced pain response was linked to more emotional reactivity [26]. Nevertheless, no conclusive evidence

was found for a larger sensitivity to anger and sadness in female FMS patients than in women without FMS, or for a larger sensitivity to anger than to sadness in female FMS patients [26]. Likewise, anger and sadness were confirmed to be general risk factors for pain amplification [26], which emphasizes the need to implement emotion regulation techniques in clinical practice in order to reduce emotional pain sensitization in FMS patients [26].

Moreover, FMS patients exhibit higher levels of state and trait anxiety, worry, and angry rumination than other chronic pain patients (e.g., osteoporosis and osteoarthritis) [27][28] and healthy participants [27]. Simultaneously, worry and angry rumination has been strongly associated within the FMS group [27]. All anger rumination scales have been associated with a poor mental health and quality of life [28]. Moreover, the reported differences on mental health and quality of life between FMS patients and healthy participants have proposed to be mediated by anger rumination [28]. Additionally, in the study of Offenbaecher et al. [19], FMS showed higher pain and anger and poorer health and quality of life, which in turn were associated to lower levels of both, forgiveness of self and forgiveness of others [19].

2.3. Interventions Aimed at Reducing or Better Coping Anger in FMS

Concerning physical activity, tension and anger showed a positive association with tests that require strength in knee extension in female FMS patients [29]. The mood states have been demonstrated to be also factors which may favor or impair motor performance [29]. El Tassa et al. [29] using the Profile of Mood States (POMS) instrument, authors reported that the greater success in physical performance is generally manifested by factors such as greater values of vigor (positive factors) and lower values of tension, depression, fatigue, confusion, and anger (usually associated with a physical depressed state). This study highlights a likely association among mood states (i.e., anger), depressive symptoms, and physical function (particularly physical function by field-based fitness tests). However, the lack of further studies at this regard should be accounted for.

Andrade et al. [30] developed a strength training program to improve the mood state of FMS patients. The strength training program had a positive impact on the patients' mood state after a single session [30]. Reductions in levels of anger (state), mental confusion, depression, fatigue, and tension due to the strength training program were also reported [30].

3. Anger in the Context of Personality Studies

Firstly, the question about whether exist or no a personality trait pattern in FMS remains under debate, and therefore its possible components, including anger, are also under debate.

The absence of an FMS personality pattern [22] has been explained through different mechanisms. Firstly, it is well-known that it may be not relevant to research about "permanent" personality traits since they are uncovered by the standard measures [31]. In addition, personality traits are always influenced or interact with the environment, and this interaction is required to be analyzed in personality research [31].

Given the previous ideas, some authors state that being a chronic pain patient, regardless of the specific chronic pain illness, seems to have a greater influence on personality [22]. It can be argued that suffering from a chronic illness might be more relevant than suffering specifically from a pain disease. It is likely that these personality characteristics are the result of the chronic condition and its coping [18]. Therefore, future research should also study the factors associated with the personality traits themselves instead of the existence or non-existence of the traits per se.

In spite of not existing or being under debate the existence or not of a FMS personality patterns, it has been confirmed that the presence of chronic pain has negative consequences in patients (e.g., predominant avoidant coping style, more state anger and anger-in, greater suicide risk, etc.) [22].

4. The Relationships between Anger and Clinical, Emotional and Cognitive Variables in FMS

Secondly, referring to the relation between anger and clinical, emotional, and cognitive variables in FMS (i.e., clinical pain, anxiety, depression, etc.), the majority of the studies has focused on the level of anger per se more than in the associations between clinical, cognitive and emotional FMS variables and anger; or the impact of anger in FMS patients; which should not be overlooked as another important research gap.

Regarding the physiological aspects, frequently, researchers have analyzed the association between brain physiology and mood through power spectra electroencephalography (EEG) analyses, specifically within the alpha power band (8–12 Hz) [32]. Alpha waves are usually related to a wakeful relaxed state, particularly visible in occipital regions when the eyes are closed, whereas cortical deactivation seems to be linked to an increase in alpha amplitude in response to a specific stimulus or task [33]. Furthermore, lower relative right hemisphere compared to left hemisphere EEG oscillations, especially in the frontal lobes, is associated with behavioral approach-oriented emotions including anger and positive mood states [32].

5. Interventions Focus on Reducing or Managing Anger in FMS

Amutio et al. [34] observed that mindfulness was effective in reducing anger (trait) in FMS patients. Authors conclude that due to the prevalence of negative emotions in FMS and the problems to manage them [24][25][35][36][37], mindfulness seems to be a good therapeutic strategy for managing negative emotions. Mindfulness leads chronic pain patients to experience awareness and acceptance of the sensations and feelings related to their symptoms whereas they continue physically and mentally active and focus on their daily life and values [34]. Mindfulness can be conceptualized as being focus on experiences in the present moment [38]. Two basic components of mindfulness are self-regulation of attention and acceptance of one's own experiences in a non-evaluative way (in other words, a non-reactive awareness) [39]. In consequence, mindfulness seems to be a potent pathway to learn and apply new non-reactive models of responding to the emotional suffering and tolerate pain

(without suffering) associated with different disorders, including FMS [34]. However, more studies are required to document the effectiveness of mindfulness programs in the reduction and management of anger in FMS patients.

6. Conclusions

Anger-in tends to be higher in FMS patients compared to healthy participants and RA patients. FMS patients also exhibit greater levels of state and trait anxiety, worry and angry rumination than other chronic pain patients. Anger seems to amplify pain in women in general, especially those with FMS and affects more the health-related quality of life of FMS patients. In spite of the relevance of emotions in the treatment of chronic pain, including FMS, only two studies have proposed intervention programs focus on anger treatment, indicating a positive reduction in anger levels through mindfulness and a strength training program, respectively. Considering the influence of negative emotions on chronic pain (for example, anger, sadness, etc.) it is vital that anger is studied more deeply in FMS in order to provide insights directed to improve the diagnosis, treatment, and quality of life of these patients. More research is also needed on the anger subject in men with FMS since gender differences (i.e., in coping strategies, symptoms, treatment adherence, etc.) are relevant in chronic disease and treatment need to be personalized. In addition, FMS patients are likely to present with anger in clinical practice. Therefore, skills for handling with angry patient are essential for primary care providers at all levels.

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