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Current Considerations on Fibromyalgia Syndrome

Consideraciones actuales sobre el síndrome de fibromialgia

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Abstract

Introduction: Fibromyalgia Syndrome is an idiopathic disease that causes permanent chronic musculoskeletal pain, stimulating severe impairment in the quality of life, disability, and alterations in mental and physical health, as well as loss of independence and cognitive and psychosocial problems in those who suffer from it.

Objective: Describe the current knowledge on fibromyalgia syndrome, and offer the most frequent and effective therapeutic perspectives, including the new model of intervention that could be suggested with a sanological strategy.

Method: A narrative review of the literature was conducted using PubMed, Scopus, Web of Science, and Google Scholar databases. 128 articles published from 2017 to 2024 were selected based on criteria of relevance, topicality, methodological rigor, and high scientific impact.

Results: The most relevant findings regarding the pathophysiological and epidemiological mechanisms, main comorbidities, and the biopsychosocial impact of the disease are presented, along with pharmacological and non-pharmacological therapeutic interventions. Likewise, emerging approaches based on sanology are also described, offering new perspectives for the comprehensive treatment of this condition. **Conclusions:** The current understanding of fibromyalgia demands multidimensional therapeutic approaches. The incorporation of sanological models may represent a promising pathway to improve clinical management and promote the overall well-being of affected individuals.

Keywords: fibromyalgia; the impact of the disease; epidemiology; treatment; sanology.

Resumen

Introducción: El Síndrome de Fibromialgia es una enfermedad idiopática que causa dolor musculoesquelético crónico permanente, provocando deterioro severo en la calidad de vida, discapacidad y alteraciones en la salud mental y física, así como pérdida de independencia y problemas cognitivos y psicosociales en quienes la padecen.

Objetivo: Describir el conocimiento actual sobre el Síndrome de Fibromialgia y ofrecer las perspectivas terapéuticas más frecuentes y efectivas, incluyendo el nuevo modelo de intervención que se podría sugerir con una estrategia sanológica.

Método: Se realizó una revisión narrativa de la literatura en las bases de datos PubMed, Scopus, Web of Science y Google Scholar. Se seleccionaron 128 artículos publicados entre 2017 y 2024 que cumplían criterios de relevancia, actualidad, rigor metodológico y alto impacto científico.

Resultados: Se presentan los hallazgos más relevantes sobre los mecanismos fisiopatológicos y epidemiológicos, principales comorbilidades, impacto biopsicosocial de la enfermedad, y las intervenciones terapéuticas tanto farmacológicas como no farmacológicas. Asimismo, se describen enfoques emergentes basados en la sanología, proponiendo nuevas perspectivas para el tratamiento integral de esta patología. **Conclusiones**: La comprensión actual de la fibromialgia exige enfoques terapéuticos multidimensionales. La incorporación de modelos sanológicos puede representar una vía prometedora para mejorar el abordaje clínico y el bienestar integral de las personas afectadas.

Palabras clave: fibromialgia; impacto de la enfermedad; epidemiología; tratamiento; sanología.

Introduction

Fibromyalgia Syndrome (FMS) is a chronic disease that affects the musculoskeletal system, causing widespread pain, hyperalgesia, and allodynia in sufferers.(1) The symptomatological identification for its diagnosis has been established by the American College of Rheumatology (ACR), based on Widespread Pain Index (WPI) and Symptom Severity Scale (SSS), consisting of unrefreshing sleep, fatigue, cognitive and somatic symptoms.(2)

However, given its idiopathic nature and that it involves rheumatological and nervous system aspects, it has been related to diffuse widespread chronic musculoskeletal pain syndrome(3), which can be present for more than three months and be associated with symptoms of fatigue, affectations in sleep quality, alterations in cognitive functioning and presence of depressive disorders.(4) Additionally, concomitance with neuropathic pain(5), rheumatoid arthritis and psoriatic arthritis has been reported(6,7), and in recent research on neurophysiological and morphological mechanisms, it has been suggested that FMS given its characteristics, should be classified as central sensitization syndrome.(8,9) Consequently, its etiology and diagnostic clarity still seem challenging for health professionals and scientific research.

Given the complexity and heterogeneity of fibromyalgia syndrome, and the ongoing debate surrounding its pathogenesis, classification, and optimal treatment strategies, it is essential to consolidate and critically examine the current scientific literature. A comprehensive narrative review can provide an integrative perspective on the latest evidence, identify prevailing therapeutic approaches, and highlight innovative frameworks—such as sanological models—that may offer promising alternatives for improving clinical management and patient outcomes. This type of synthesis is particularly relevant in the context of evolving multidisciplinary interventions and the need for personalized approaches in chronic pain syndromes.

The objective of this narrative review is to describe the current knowledge on fibromyalgia syndrome and offer the most frequent and effective therapeutic perspectives, including the new model of intervention that could be offered with a sanological strategy.

Method

A descriptive narrative synthesis of the literature was carried out to integrate and analyze the most relevant scientific evidence on fibromyalgia syndrome. The search was conducted in four major databases: PubMed, Scopus, Web of Science, and Google Scholar. The review focused on articles published between 2017 and 2024.

The inclusion criteria were: (a) peer-reviewed original articles or systematic reviews; (b) studies published in English or Spanish; (c) research that addressed pathophysiological, clinical, therapeutic, or psychosocial aspects of fibromyalgia; and (4) articles with high methodological quality, corresponding to levels of evidence 1 and 2, according to the Oxford Centre for Evidence-Based Medicine. Priority was given to publications in high-impact journals indexed in Q1 or Q2 quartiles.

Exclusion criteria included: (1) conference abstracts, opinion pieces, or non-peer-reviewed sources; and (2) studies with unclear methodologies or low scientific rigor.

A total of 128 articles meeting these criteria were selected. The information was organized and presented narratively, emphasizing the most robust and recent evidence available in the scientific literature.

Development

Pathophysiology

The etiology and pathophysiology of FMS are still uncertain despite the many studies that have been performed. The factors related to its occurrence may be genetic, environmental, hormonal, neural, and immunological, and although in most patients, it is not possible to distinguish any specific cause(10,11), the most notable and influential are mechanical and psychological stress.(12)

Within the genetic factors, polymorphisms have been reported in several genes, such as Catechol-O-Methyltransferase(13), and in those related to the reception, transport, and degradation of the catecholamine group, specifically dopamine and serotonin.(14) Additionally, FMS appears to have an eightfold higher heritability factor for those with immediate family members diagnosed.(15)

Environmental factors studies have reported an increased likelihood of developing the disease in people with a history of childhood sexual abuse, exposure to catastrophes or war(16,17), as well as family conflict and parental death during childhood, and low economic income.(15,18,19)

Neural factors are the most studied and supported by neurophysiological, morphological, and functional imaging techniques. Within the field, some authors have called *Central Pain Amplification* or *Central Sensitization* the process by which repeated and constant lesions are caused in the peripheral nociceptive fibers from the medulla to the dorsal, causing widespread pain over time(20), and generating the famous hypersensitivity to pain mediated by amplification of such neuronal signaling in the central nervous system.(21) However, other authors disagree with this distinction since, on the one hand, Häusser et al.(11) have suggested a pathogenesis model in which biological and psychosocial variables interact in predisposition, triggering, and aggravation, while other authors argue for a different mechanical triggering process, giving the protagonism not at the brain or central nervous system level but as a stress-induced neuropathic pain syndrome(22), and also in the dorsal root ganglia as the primary source of pain in FMS.(23)

From a neuroanatomical point of view, changes in thalamic structures and functions have been reported.(24) These alterations are due to reduced connectivity between the lateral and posterior thalamus and the periaqueductal grey matter, as well as increased connectivity of the posterior thalamus and bilateral inferior parietal areas, which are associated with maladaptive processing of external stimuli and amplification of pain.(25) Likewise, low cortical thickness has been reported in the cingulate gyrus and inferior occipital gyrus, probably associated with excitotoxicity due to high levels of glutamate.(26) Other findings have been decreased volume in all prefrontal cortex regions and grey matter with each year of age.(27)

Consequently, high levels of substance P have been found in cerebrospinal fluid in patients with FMS, which could be closely related to a poor inhibitory response to pain, increasing its perception and inflammation in tissues.(28,29) In addition, this abnormal sensation of pain and anodynia may be mediated by sensitization processes of ascending fibers of the spinothalamic bundle to continuous stimuli and the potential production of inflammatory substances related to the subcutaneous superficial fascia.(30) On the other hand, inhibitory neurotransmitters such as serotonin, dopamine, and norepinephrine have been found in low levels in descending anti-nociceptive pathways in the spinal cord.(31,32) Coupled with possible alterations in pain modulation due to low levels of endogenous opioids and dopamine dysregulation, these contribute to the manifestation of hyperalgesia.(33,34)

The study of other FMS triggers has reported alterations in the descending modulation of pain mechanism and increased cortisol levels(20,35), hypertension and cardiac alterations(36,37,38), oxidative stress with elevated nitric oxide levels, lipid peroxidation and mitophagy(39), as well as sleep disturbances and low melatonin levels.(40,41) Given the multiple triggers studied, they have led researchers to analyze with equal importance the perspectives of central, peripheral, and integrative mechanisms that generate pain in FMS.(42,43)

Parvovirus, Epstein Barr virus (EBV), Lyme disease(20), herpesvirus HHV-6(44), Chagas disease(45), Covid-19(46), and other infections such as HIV, hepatitis virus, influenza, or bacteria such as Borrelia burgdorferi(47), have been linked as triggering or coexisting factors of FMS in some studies.

Although pathophysiological research has made significant findings in the understanding of the FMS development and onset, some authors recognize that these mechanisms are not precisely known and grant it a multifactorial character or even doubt its existence, associating it with the manifestation of other pathologies.(48)

Comorbidities

The comorbidities involved in FMS are wide-ranging and could be understood in two directions, given the clinical manifestations of its onset. On the one hand, FMS can be a comorbid disease in other pre-existing diseases, as has been consistently reported in cases of rheumatoid arthritis and in other rheumatologic pathologies such as spondyloarthritis, psoriatic arthritis and ankylosing spondylitis(49,50), and in non-rheumatologic such as Ménière's disease, small intestinal bacterial overgrowth (SIBO) and systemic lupus erythematosus.(51,52,53)

On the other hand, FMS as a pre-existing disease has been associated with comorbidity with irritable bowel syndrome and migraine, temporomandibular disorders, cardiovascular diseases such as hypertension, coronary artery and heart rhythm diseases, and endocrine diseases such as diabetes mellitus and hypothyroidism.(54,55,56)

Psychological and psychiatric disorders have also been extensively studied. It has been reported that 25% of patients with FMS have a major depressive disorder, and 65% experience this disorder in their lifetime(57), as well as alexithymia in 48% of them.(58) The risks and prevalence of suicidal ideation, suicide attempts, and completed suicide, associated with functional impairment, unemployment, comorbidities, and drug dependence, among others, have even been reported.(59,60,61)

Additionally, it has been associated with a high prevalence of anxiety, mood disorders, post-traumatic stress disorder, borderline personality, and obsessive-compulsive personality, evidencing a mutual reinforcement between the main symptoms of FMS and affective and emotional comorbidities.(62) As a result, it has been reported that these psychopathological manifestations generate neuroanatomical changes in these patients, with negative correlations observed in the volume of the grey matter between trait anxiety and the amygdala, as well as positive correlations in the white matter between depression, the brainstem, and the postcentral gyrus.(63)

Furthermore, problems have been reported in cognitive functioning, specifically in attention, memory, and executive functions, such as planning and processing speed(64), which worsen with higher levels of depression and anxiety(65), causing alterations in their quality of life and activities of daily living (Montoro et al., 2016).(66)

Given the difficulties in diagnosis and treatment, genetic studies have confirmed possible predispositions to psychiatric conditions, autoimmune conditions, and pain tenderness associated with FMS (Moscati et al., 2023).(67)

Finally, mortality studies have reported suicide, accidents, infections, chronic liver disease, cerebrovascular disease, chronic respiratory tract disease, heart disease, and, to a lesser extent, cancer as the leading causes of death in patients with FMS.(68,69)

Epidemiology

Epidemiological studies have described FMS as having a prevalence of approximately 2% to 7% in the general population(70,71), and the estimated mean incidence of the diagnosis is 4.5 per 1,000 persons per year seen by a physician.(72)

A rigorous study on the epidemiology of FMS in the general population reported that the prevalence in women reaches up to 6.8%, in urban and rural areas up to 11.4% and 5.2%, respectively, and an alarming prevalence of up to 15% in special populations.(70)

Although a historically higher prevalence has been demonstrated in women, changes in diagnostic criteria and its diverse etiology have further balanced the scales, with an approximate 2:1 ratio to men observed in recent studies.(73)

Associated risk factors expose a higher prevalence in the female population(74), pre-existing medical disorders, presenting middle or old age, overweight, smoking and alcohol abstinence, and especially, history of sleep disorders, depression, headaches, and other pain.(72)

It should be clarified that FMS does not exclusively affect the adult population. Juvenile Primary Fibromyalgia Syndrome, or JPFS as its acronym, has been termed the onset and suffering of symptoms in children and adolescents, with an estimated prevalence as high as 5.5% to 6.2% in Turkey and North American countries.(75,76,77) Although the average age of symptom onset is between 11 and 13 years, its diagnosis does not come before 14 to 15 years of age, suggesting, as is usual in FMS, that due to its multifactorial etiological nature, it may affect diagnostic clarity and an insidious onset at younger ages may be suspected, widening the prevalence ranges, and generating alterations in the quality of life, depression and school difficulties in these minors.(75,78,79)

In Latin America, epidemiological data on FMS are limited. However, in Chile, the highest prevalence was estimated at 3.3%(80), followed by Brazil at 2.0%(81), Peru at 1.09%(82), Mexico 0.68%(83), while in Venezuela a reduced 0.2%.(84) In Colombia, a point estimate of prevalence was determined at 0.72%, that is, a projection to the population between 51,387 and 121,409 people, a study conducted in the cities of Bogota, Medellin, Cali, Barranquilla, Bucaramanga, and Cucuta, where a prevalence of 2.27% in women and 0.05% in men was obtained.(85)

It is evident that countries such as the United States with 6.4%(86), Scotland with 5.4%(87), France, Italy, Germany, Spain, and Portugal between 2.9% and 4.7%(88), present possibly the highest prevalences, distinguishing the Caucasian ethnic population as those affected mainly by FMS (Marques et al., 2017).(70)

Disease Impact

Given all the clinical manifestations of FMS mentioned above and the onset of its symptoms generally appearing in adulthood, it is understandable that it generates unfavorable consequences in all areas of those suffering from it. First, it is expected that the diagnosis of FMS can take up to 2 years from the onset of symptoms(89), with frequent repeated visits to specialists, clinical examinations, various diagnoses, and medication consumption during this time, aspects that probably generate uncertainty, changes in quality of life and daily activities, both in these people and in their families.

After diagnosis, unfavorable changes are not necessarily suppressed. Although treatments can partially or temporarily diminish symptoms, the physical, psychological, and social consequences generate alterations in patients' individual, family, and work aspects.(62) Positive coping strategies are the primary way to accept the disease and maintain an adequate quality of life.(90)

From the individual point of view, it has been reported that depression and anxiety are the symptoms of FMS that decisively predict the quality of life. Physical pain and vitality are the most affected aspects.(91) Another fundamental aspect is the sleep disturbances they experience, given the direct consequences on pain inhibition(92), fatigue, and mental health, triggering, with high probability, a worse impact of the disease. It has even been described that people with FMS have higher pain intensity and more severe symptom consequences affecting activities of daily living compared to people with chronic widespread musculoskeletal pain.(93)

Work capacity is undoubtedly an area of concern that affects and generates discomfort in people with FMS. The clinical symptoms of the disease interfere directly with the execution of work responsibilities since they generate an increase in the intensity of pain, feelings of fatigue, distrust in the performance of activities that were previously performed commonly, fear of losing their job, disappointment, higher levels of anxiety, stress and physical overload. Still, at the same time, they identify work relationships with their colleagues and family support in the face of work as factors that generate satisfaction and well-being amid their disease.(94) However, there is a high risk of unemployment and prolonged disability in people with FMS(95), which can generate a direct impact on the personal and family economy, in addition to having to deal with the high financial costs of their treatment.(96,97) For this reason, adaptation in workplaces and working conditions is always recommended; however, these adjustments hardly ever come to fruition.(95)

Regarding the family and social environment, the symptomatological manifestations of FMS directly or indirectly affect family and social relationships. Still, good support in these dimensions represents an excellent opportunity to facilitate coping and obtain a better quality of life. Specifically, it has been investigated that beyond the impact of the disease on the patient, family members are also affected, experiencing emotional exhaustion and states of overprotection that make it difficult for them to set limits on the care they provide.(98) On the other hand, it has been reported that high levels of depressive symptomatology and self-perceived pain in patients with FMS are associated with worse levels of interpersonal support.(99) However, those patients who report excellent social support have more self-compassion and better quality of life and mental health.(100) Consequently, the relationship between positive coping strategies and good marital relationships is generative of good mental quality of life in patients.(101) In general terms, social support networks such as families can facilitate adequate coping with the disease by stimulating integration activities, emotional support, and support for caregiving and by establishing limits that reduce overprotection.(102)

The impairment in the performance of activities of daily living is possibly one of the significant changes that patients with FMS must experience. Pain has been shown to play a leading role in decreasing the ability to perform activities of daily living, no matter how basic they may be.(103) Unfortunately, more than 50% of people with these pathologies involving chronic pain have reported limitations in activities of everyday living.(104) However, there has been research on the positive effects of intensive treatments based on daily activities in relieving stiffness and feeling good in patients.(105)

Consequently, no significant gender differences have been reported regarding the impact of the disease. Still, some results suggest a greater affectation in men than women, specifically in pain tenderness, sleep, and mental health.(106)

Numerous studies have evidenced that patients with FMS present alterations and difficulties in their quality of life, activities of daily living, work situation, and family and social environment.(91,107)

Pharmacological and Non-Pharmacological Treatment Approaches

Table 1 presents some pharmacological treatments and their main benefits in reducing pain and improving the quality of life reported in the literature.

Table 1 - Pharmacological treatments and main benefits in patients with FMS

Medication	Reported Benefits	References
Gabapentin (extended release).	It significantly relieves pain, reduces the impact of the disease, and improves the quantity and quality of sleep.	108
Pregabalin	It improves clinically significant pain, the patient's general condition, and sleep quality.	109
Amitriptyline	It is practical and acceptable for improving health-related quality of life, sleep, and fatigue.	110,111
Milnacipran	Significant improvement of symptoms and reduction of fatigue.	112
Cyclobenzaprine	Significant relief of daily pain, reduced impact of the disease, and improved sleep quality.	113
Duloxetine	Efficacy in the treatment of depression and pain.	110,111
Tramadol, in combination with analgesic	Positive effect on pain and improvement in life quality.	114

Note. As raised on the scarce pharmacological evidence by Häuser and Fitzcharles(48) and Welsch et al.(115), a comprehensive review of benefits, dosage, efficacy, side effects, contraindications, and medical agency approval is suggested for each country.

The pharmacological approach to FMS is very heterogeneous. Different groups have different pharmacodynamic and pharmacokinetic properties and levels of efficacy within each group. Some groups are antidepressants, anticonvulsants, muscle relaxants, hormonal, monoamine oxidase inhibitors, nonsteroidal anti-inflammatory drugs, serotonin-norepinephrine reuptake inhibitors, selective serotonin reuptake inhibitors, and, of course, opioids.(71) Additionally, although cannabinoids and NMDA antagonists currently offer important expectations on pain modulation, quality of life, and well-being of patients with FMS, the results of their efficacy and effectiveness are still premature and controversial, so further research has been suggested to support their therapeutic potential.(116) However, institutions such as the U.S. Food and Drug Administration (FDA) have approved only three drugs, pregabalin, duloxetine, and milnacipran, for treating FMS.(116)

Currently, patients with FMS report a greater acceptance of non-pharmacological treatments compared to pharmacological treatments despite similar effectiveness ratings(117), which could be related to the side effects of drugs, polypharmaceutical consumption and lack of education about the treatments, probably due to fear or uncertainty regarding the pharmacological approach.

Psychologists are one of the professions involved in the multidisciplinary team for patients with FMS. This profession has been reported to carry out three main activities: assessment measures, intervention, and research.(118) The categories in the assessment measures include cognitive, emotional, coping, and activity patterns, and finally, relationship/contextual variables.(118) Regarding interventions, numerous studies and institutions in various countries have rated cognitive behavioral therapy (CBT) with the highest level of evidence-based confidence, demonstrating outstanding effectiveness.(119) Other non-pharmacological treatments from psychological interventions are shown in Table 2.

Table 2 - Non-pharmacological treatments - most commonly used psychotherapies

Psychotherapies	Reported Benefits	References
Cognitive behavioral therapy (CBT)	It positively impacts quality of life and daily activities, pain relief, stress reduction, depression, anxiety, fatigue, stiffness, and associated insomnia. Long-term effect	120
	Reduction in pain catastrophizing, pain interference, and symptom impact. Adaptive alterations in neural functional connectivity	121
	It significantly decreased proinflammatory cytokines (primary proinflammatory mediators in the pathogenesis of FMS).	122
	It has a positive effect on the physical, emotional, and behavioral condition of patients.	123
Internet-based Cognitive Behavioral Therapy	A clinically significant benefit is reduced negative mood and disability at the end of treatment.	124
Acceptance and Commitment Therapy	Improvement in pain and disability. Decrease in anxiety, depression, and fatigue.	125
	It has a significant impact on depression, chronic fatigue, and pain intensity.	126
Mindfulness	Reduction of pain symptoms and pain perception	127,128
	It reduces the interference of pain and the impact of the disease and improves psychological health and quality of life.	129
	Improved sleep quality and less interference from pain, anxiety, and depression	130
	It shows immune regulatory effects and a	131

	reduction of medical severity.	
Psychoeducation	It reduces emotional and clinical symptoms, as well as increases functional condition.	132
	Improvement in pain management and intensity and related emotions, symptom relief, improvement in functional condition, and health-related quality of life	133
Brief Psychodynamic Therapy	Decrease in the impact of the disease and the associated depression and anxiety. Improved health-related quality of life	134
	Effective and significant reduction of uncertainty intolerance and depression	135
Hypnosis and Hypnotherapy	Self-administered audio-recorded hypnosis: a significant decrease in intensity, pain interference, fatigue, and depression	136
	Symptom-oriented hypnosis: control and reduction of pain, fatigue, anxiety, depression, disability, and sleep disorders. Hypnotherapy: Resolving emotional conflicts associated with FMS	137,138

Note. The empirical and randomized controlled trial studies of psychotherapies for FMS generally reported that patients maintained their standard pharmacological treatment.

Non-pharmacological treatments without psychological intervention are diverse and are increasingly receiving more and more research interest. In this group, aerobic exercise, chiropractic, hydrotherapy, massage, homeopathy, and meditative movements such as yoga, tai-chi, and body awareness therapy, among others, are observed. These are considered safe, without adverse events, and effective against symptom reduction. However, more research is required to provide definitive results.(71) Multicomponent treatment, with great expectations at present, involves the combination of relaxation, education, exercise, yoga or massage, cognitive behavioral therapy (CBT), among others, evidencing so far, no adverse events, clinical improvement after the intervention, relief of suffering, holistic, beneficial to health and good cost-utility ratio, being promising as well as mindfulness, hydrotherapy and acupuncture.(139,140)

Nevertheless, although controversial, routine acupuncture could improve the quality of life and relieve pain. However, more studies are needed to support it.(141) Finally, other non-pharmacological treatments that have employed technological devices such as smartphones or wearable devices have demonstrated effectiveness in monitoring and reducing pain and disease impact.(142)

In general, combined multidisciplinary rehabilitation treatments benefit patients' life dimensions, usually including psychoeducation programs, aerobic and resistance exercise, stretching, relaxation techniques, biofeedback, and cognitive behavioral therapy (CBT).(143) However, there may be barriers to access to health and rehabilitation services in low-income contexts, specialized training for FMS in the professional team, and patients' unwillingness to attempt treatment, possibly due to the emotional and physical impact of the disease itself.

Sanology: A hopeful therapeutic approach

Sanology currently comprises a new paradigm of understanding and intervention in human health. It conceives the health-disease process from a perspective that is not reductionist or hegemonic but inclusive of the multitude of variables and dimensions that may be mediating both the concept that a person gives to their health and the pressing needs and vital objectives that the subject wishes to face or overcome when facing an illness. Among the dimensions, we can find not only the physical-biological position but also the psychological, environmental, spiritual, and, above all, the social, historical, and cultural, recognizing the inherent behavioral dynamism that makes up the various stages of the life cycle and, of course, the coexistence of disease in the daily spaces that people face.(144)

From this point of view, the patient is responsible for establishing their therapeutic purpose and achieving their highest satisfaction, well-being, and quality of life by coping with and overcoming their symptoms. Consequently, the multidisciplinary health professional team would be a guide, companion, and permanent provider of therapeutic resources based on scientific evidence, which seeks to integrate the coping of the disease and the re-establishment of satisfaction in the patient's life categories. From the above, an eminently educational approach can be appreciated, which seeks, among other things, to intervene to achieve patients' well-being from a position that attempts to articulate axiological, ethical, family, motivational, cultural, and salutogenic aspects.(145)

The intervention model with a sanological strategy has shown outstanding results in people with mental disorders, evidencing significant increases in positive health states, decreasing limitations due to emotional problems, and improving the modulation of mood states.(146) Additionally, significant changes in health status, health concepts and use of physical exercise in overweight people have been reported(147,148), improvement in the perception of health and well-being, and changes in healthy lifestyle habits in mothers caring for children with congenital disabilities(149), and various health promotion, prevention and intervention programs with outstanding results.(150)

Consequently, multidisciplinary intervention with a sanological strategy, either exclusively or combined with other treatments, may greatly benefit the comprehensive treatment of people diagnosed with FMS. Given the characteristics of this new model's clinical approach, patients with FMS could participate as protagonists in defining their therapeutic objectives, increasing their perception of autonomy, adherence to treatment, and establishing behaviors that promote the individual achievement of the highest level of well-being, satisfaction, and quality of life in the context of coping with their diagnosis.

Conclusions

For all of the above, FMS should be assumed as an idiopathic nosological entity with clearly defined comorbidities that impact activities of daily living and diminish the quality of life of those who suffer from it. Its interest in clinicians, researchers, and society has increased along with its incidence and prevalence in the general population.

Significant advances have been made in efficacy and efficiency in the pharmacological and non-pharmacological treatments reported; however, effectiveness continues to be debated and, at times, controversial.

Integrative, evidence-based treatments that consider each person's individual needs are required. A methodology that could favor this *person-to-person* treatment is that established by sanology or *sanological strategy*, where each patient is aware of their state of health and is an active part of their treatment, establishing with the support of their treating clinician, the most favorable and available therapeutic approach about their most pressing needs.

References

1. Cabo-Meseguer A, Cerdá-Olmedo G, Trillo-Mata J. Fibromialgia: prevalencia, perfiles epidemiológicos y costes económicos. Med Clin (Barc). 2017;149(10):441-8. doi: 10.1016/j.medcli.2017.06.008.

2. Wolfe F, Clauw D, Fitzcharles MA, Goldenberg R, Mease P, Russell A, Russell I, Winfield J, Yunus M. The American College of Rheumatology preliminary diagnostic criteria for fibromyalgia and measurement of symptom severity. Arthritis Care Res (Hoboken). 2010;62(5):600-10. doi:10.1002/acr.20140.

3. Covarrubias-Gómez A, Carrillo-Torres O. Actualidades conceptuales sobre fibromialgia. Rev Mex Anestesiol. 2016;39(1):58-63. Available from: https://www.medigraphic.com/pdfs/rma/cma-2016/cma161g.pdf.

4. Velasco M. Dolor musculoesquelético: fibromialgia y dolor miofascial. Rev Méd Clin Las Condes. 2019;30(6):414-427. doi: 10.1016/j.rmclc.2019.10.002.

5. Mankır M, Ardıçoğlu Ö, Alkan B, Fidan F. Neuropathic pain in females with fibromyalgia syndrome: the role of obesity. Turk J Osteoporos. 2023;29:10-6. doi: 10.4274/tod.galenos.2022.62144.

6. Kılıçarslan A, Yurdakul FG, Bodur H. Diagnosing fibromyalgia in rheumatoid arthritis: The importance of assessing disease activity. Turk J Phys Med Rehabil. 2018;64(2):133–139. doi: 10.5606/tftrd.2018.1618.

7. Mülkoğlu C, Ayhan FF. The impact of coexisting fibromyalgia syndrome on disease activity in patients with psoriatic arthritis and rheumatoid arthritis: A cross-sectional study. Mod Rheumatol. 2021;31(4):827-33. doi: 10.1080/14397595.2020.1823069.

8. De Tommaso M, Vecchio E, Nolano M. The puzzle of fibromyalgia between central sensitization syndrome and small fiber neuropathy: A narrative review on neurophysiological and morphological evidence. Neurol Sci. 2022;43:1667-84. doi: 10.1007/s10072-021-05806-x.

9. Dumolard A, Lefaucheur JP, Hodaj E, Liateni Z, Payen JF, Hodaj H. Central sensitization and small-fiber neuropathy are associated in patients with fibromyalgia. Clin J Pain. 2023;39(1):8-14. doi: 10.1097/AJP.0000000000001085.

10. García D, Mendoza C. Fisiopatología de la fibromialgia. Reumatol Clin. 2020;16(3):191-194. doi:10.1016/j.reuma.2020.02.003.

11. Häuser W, Ablin J, Fitzcharles MA, Littlejohn G, Luciano JV, Usui C, Walitt B. Fibromyalgia. Nat Rev Dis Primers. 2015;1(1):1-16. doi:10.1038/nrdp.2015.22.

12. Amsterdam D, Buskila D. Etiology and triggers in the development of fibromyalgia. In: Ablin J, Shoenfeld Y, editors. Fibromyalgia Syndrome. Springer, Cham; 2021. doi: 10.1007/978-3-030-78638-0_3.

13. Szezerbaty S, Zicarelli C, de Lima L, Perrucini P, Fernandes K, Poli-Frederico R. COMT rs4680 single nucleotide polymorphism, ethnicity, and age are associated with fibromyalgia in women. Res Soc Dev. 2021;10(7). doi: 10.33448/rsd-v10i7.15225.

14. Muñóz-Gaytán DE, Guzmán-Silahua S, Orozco-Barocio G, Rodríguez-Ruiz JA, García-de la Torre I, Orozco-López G, et al. Consideraciones fisiopatogénicas en fibromialgia. Salud Jalisco. 2020;6(3):207-9. Available from: https://www.medigraphic.com/pdfs/saljalisco/sj-2019/sj193i.pdf.

15. Arnold L, Hudson J, Hess E, Ware A, Fritz D, Auchenbach M, Starck L, Keck Jr P. Family study of fibromyalgia. Arthritis Rheumatol. 2004;50(3):944-52. doi: 10.1002/art.20042.

16. Kaleycheva N, Cullen A, Evans R, Harris T, Nicholson T, Chalder T. The role of lifetime stressors in adult fibromyalgia: Systematic review and meta-analysis of case-control studies. Psychol Med. 2021;51(2):177-193. doi: 10.1017/S0033291720004547.

17. Carta M, Moro M, Pinna F, Testa G, Cacace E, Ruggiero V, Piras M, Romano F, Minerba L, Machado S, Freire R, Nardi A, Sancassiani F. The impact of fibromyalgia syndrome and the role of comorbidity with mood and post-traumatic stress disorder in worsening the quality of life. Int J Soc Psychiatry. 2018;64(7):647-55. doi: 10.1177/0020764018795211.

18. Konak H, Sert H. Pain Levels in Female Patients with Fibromyalgia and Affecting Factors. Int J Caring Sci. 2018;11(3):1631-1637. Available from: http://internationaljournalofcaringsciences.org/docs/34_konak_riginal_11_3.pdf

19. Creed F. The risk factors for self-reported fibromyalgia with and without multiple somatic symptoms: The Lifelines cohort study. J Psychosom Res. 2022;155:110745. doi: 10.1016/j.jpsychores.2022.110745.

20. Guzmán-Silahua S, Muñoz-Gaytán D, Mendoza-Vázquez G, Orozco-Barocio G, Rodríguez-Ruiz J, de la Torre I, Orozco-López G, Nava-Zavala A. Fibromialgia. El Residente. 2018;13(2):62-67. Available from: https://www.medigraphic.com/cgi-bin/new/resumenI.cgi?IDARTICULO=81715.

21. Nijs J, George S, Clauw D, Fernández-de-las-Peñas C, Kosek E, Ickmans K, et al. Central sensitisation in chronic pain conditions: latest discoveries and their potential for precision medicine. Lancet Rheumatol. 2021;3(5). doi: 10.1016/S2665-9913(21)00032-1.

22. Martínez-Lavín M. Fibromyalgia and small fiber neuropathy: the plot thickens! Clin Rheumatol. 2018;37(12):3167-71. doi: 10.1007/s10067-018-4300-2.

23. Martínez-Lavín M. Centralized nociplastic pain causing fibromyalgia: an emperor with no clothes? Clin Rheumatol. 2022;41(12):3915-7. doi: 10.1007/s10067-022-06407-5.

24. Theoharides TC, Tsilioni I, Bawazeer M. Mast cells, neuroinflammation and pain in fibromyalgia syndrome. Front Cell Neurosci. 2019;13:353. doi: 10.3389/fncel.2019.00353.

25. Kim DJ, Lim M, Kim J, Chung C. Structural and functional thalamocortical connectivity study in female fibromyalgia. Sci Rep. 2021;11(1):23323. doi: 10.1038/s41598-021-02616-1.

26. Feraco P, Nigro S, Passamonti L, Grecucci A, Caligiuri M, Gagliardo C, Bacci A. Neurochemical correlates of brain atrophy in fibromyalgia syndrome: A magnetic resonance spectroscopy and cortical thickness study. Brain Sci. 2020;10(6):395. doi:10.3390/brainsci10060395.

27. Murillo-García A, Leon-Llamas JL, Villafaina S, Gusi N. Fibromyalgia impact in the prefrontal cortex subfields: An assessment with MRI. Clin Neurol Neurosurg. 2022;219:107344. doi: 10.1016/j.clineuro.2022.107344.

28. Conti P, Gallenga CE, Caraffa A, Ronconi G, Kritas SK. Impact of mast cells in fibromyalgia and low-grade chronic inflammation: Can IL-37 play a role?. Dermatol Ther. 2020;33(1). doi: 10.1111/dth.13191.

29. Russell IJ, Orr MD, Littman B, Vipraio GA, Alboukrek D, Michalek JE, Lopez Y, MacKillip F. Elevated cerebrospinal fluid levels of substance P in patients with the fibromyalgia syndrome. Arthritis Rheum. 1994;37(11):1593-1601. doi: 10.1002/art.1780371106.

30. Bordoni B, Marelli F, Morabito B, Cavallaro F, Lintonbon D. Fascial preadipocytes: Another missing piece of the puzzle to understand fibromyalgia?. Open Access Rheumatol Res Rev. 2018;27-32. doi: 10.2147/OARRR.S155919.

31. Qureshi A, Jha S, Iskander J, Avanthika C, Jhaveri S, Patel V, Potini B, Azam AT. Diagnostic challenges and management of fibromyalgia. Cureus. 2021;13(10). doi: 10.7759/cureus.18692.

32. Coskun I. Role of inflammation in the pathogenesis and treatment of fibromyalgia. Rheumatol Int. 2019;39(5):781-91. doi: 10.1007/s00296-019-04251-6.

33. Gyorfi M, Rupp A, Abd-Elsayed A. Fibromyalgia pathophysiology. Biomedicines. 2022;10(12):3070. doi:10.3390/biomedicines10123070.

34. Mezhov V, Guymer E, Littlejohn G. Central sensitivity and fibromyalgia. Intern Med J. 2021;51(12):1990-8. doi: 10.1111/imj.15430.

35. Úbeda-D'Ocasar E, Jiménez Díaz-Benito V, Gallego-Sendarrubias GM, Valera-Calero JA, Vicario-Merino Á, Hervás-Pérez JP. Pain and cortisol in patients with fibromyalgia: Systematic review and meta-analysis. Diagnostics. 2020;10(11):922. doi: 10.3390/diagnostics10110922.

36. Aksu E, Berk E, Sökmen A, Sökmen G, Celik E. Subclinical cardiac structural and electrical abnormalities in fibromyalgia syndrome. Turk J Med Sci. 2020;50(4):885-93. doi: 10.3906/hundimiento-1912-228.

37. Kobat MA. A frequent problem in systolic heart failure: Fibromyalgia. Cardiol Cardiovasc Med. 2021;5(4):395-403. doi: 10.26502/fccm.92920209.

38. Kulshreshtha P, Deepak KK, Yadav RK, Mukherjee D. Cardiac autonomic neuropathy in fibromyalgia: Revisited. J Back Musculoskelet Rehabil. 2022;35(1):111-117. doi: 10.3233/BMR-200209.

39. Assavarittirong C, Samborski W, Grygiel-Górniak B. Oxidative stress in fibromyalgia: From pathology to treatment. Oxid Med Cell Longev. 2022;2022:1582432. doi: 10.1155/2022/1582432.

40. González-Flores D, López-Pingarrón L, Castaño MY, Gómez MA, Rodríguez AB, García JJ, Garrido M. Melatonin as a coadjuvant in the treatment of patients with fibromyalgia. Biomedicines. 2023;11(7):1964. doi:10.3390/biomedicines11071964.

41. Leon-Llamas JL, Villafaina S, Murillo-Garcia A, Domínguez PR, Gusi N. Relationship between pineal gland, sleep and melatonin in fibromyalgia women: a magnetic resonance imaging study. Acta Neuropsychiatr. 2022;34(2):77-85. doi: 10.1017/neu.2021.35.

42. Pérez-Neri I, Sandoval H, Estêvão MD, Vasanthan L, Alarcon-Ruiz C, Ruszkowski J, Mathangasinghe Y, Ríos C, Pineda C. Central and peripheral mechanisms of pain in fibromyalgia: scoping review protocol. Rheumatology International. 2023;43(4):757-762. doi: 10.1007/s00296-023-05275-9.

43. Pinto AM, Luís M, Geenen R, Palavra F, Lumley M, Ablin J, Amris K, Branco J, Buskila D, Castelhano J, Castelo-Branco M, Crofford L, Fitzcharles MA, Häuser W, Kosek E, Mease P, Reis T, Jacobs J, Castilho P, da Silva J. Neurophysiological and psychosocial mechanisms of fibromyalgia: A comprehensive review and call for an integrative model. Neuroscience & Biobehavioral Reviews. 2023. doi: 10.1016/j.neubiorev.2023.105235.

44. Krumina A, Chapenko S, Kenina V, Mihailova M, Logina I, Rasa S, Gintere S, Viksna L, Svirskis S, Murovska M. The role of HHV-6 and HHV-7 infections in the development of fibromyalgia. J NeuroVirol. 2019;25:194-207. doi: 10.1007/s13365-018-0703-8.

45. De Carvalho JF, Lerner A. Fibromyalgia associated with Chagas' disease treated with nutraceuticals. Clin Nutr ESPEN. 2021;42:212-4. doi: 10.1016/j.clnesp.2021.01.037.

46. Pessano M, Silva E, Marchesan S. Could the fibromyalgia syndrome be triggered or enhanced by COVID-19? Inflammopharmacology. 2023;31(2):633-651. doi: 10.1007/s10787-023-01160-w.

47. Cohen SP, Wang EJ, Doshi TL, Vase L, Cawcutt KA, Tontisirin N. Chronic pain and infection: mechanisms, causes, conditions, treatments, and controversies. BMJ Med. 2022;1(1). doi: 10.1136/bmjmed-2021-000108.

48. Häuser W, Fitzcharles MA. Facts and myths pertaining to fibromyalgia. Dialogues Clin Neurosci. 2018;20(1):53-62. doi:10.31887/DCNS.2018.20.1/whauser.

49. Kozanoğlu E, Kelle B, Alaylı G, Kuru Ö, Çubukçu S, Demir A, Karakoç M, Özçakır Ş, Altay Z, Aktaş İ, Özkan F, Ayhan F, Çapkın E, Karkucak M, Kaya T, Uçar Ü, Erdal A, Taştekin N, Koyuncu E, Akıncı A. Frequency of fibromyalgianess in patients with rheumatoid arthritis and ankylosing spondylitis: A multicenter study of Turkish League Against Rheumatism (TLAR) network. Arch Rheumatol. 2023;38(x). doi: 10.46497/ArchRheumatol.2023.9925.

50. Duffield S, Miller N, Zhao S, Goodson N. Comorbid fibromyalgia complicating rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis and spondyloarthritis: A systematic review and meta-analysis. Rheumatology. 2018;57(3). doi: 10.1093/rheumatology/key075.533.

51. López-Escamez JA, Vela J, Frejo L. Immune-Related Disorders Associated With Ménière's Disease: A Systematic Review and Meta-analysis. Otolaryngol Head Neck Surg. 2023:1-10. doi: 10.1002/ohn.386.

52. Efremova I, Maslennikov R, Poluektova E, Vasilieva E, Zharikov Y, Suslov A, Letyagina Y, Kozlov E, Levshina A, Ivashkin V. Epidemiology of small intestinal bacterial overgrowth. World J Gastroenterol. 2023;29(22):3400-3421. doi:10.3748/wjg.v29.i22.3400.

53. Minhas D, Marder W, Hassett AL, Zick S, Gordon C, Harlow S, et al. Cost-related prescription non-adherence and patient-reported outcomes in systemic lupus erythematosus: The Michigan Lupus Epidemiology & Surveillance program. Lupus. 2023. doi: 10.1177/09612033231186113.

54. Todor T, Fukudo S. Systematic review and meta-analysis of calculating degree of comorbidity of irritable bowel syndrome with migraine. BioPsychoSocial Med. 2023;17(1):22. doi: 10.1186/s13030-023-00275-4.

55. Ayouni I, Chebbi R, Hela Z, Dhidah M. Comorbidity between fibromyalgia and temporomandibular disorders: A systematic review. Oral Surg Oral Med Oral Pathol Oral Radiol. 2019;128(1):33-42. doi: 10.1016/j.oooo.2019.02.023.

56. Bilge U, Sari YE, Balcioglu H, Yasar Bilge NS, Kasifoglu T, Kayhan M, Unluoglu I. Prevalence of comorbid diseases in patients with fibromyalgia: A retrospective cross-sectional study. JPMA J Pak Med Assoc. 2018;68(5):729-32. Available from: https://pubmed.ncbi.nlm.nih.gov/29885171/.

57. Løge-Hagen JS, Sæle A, Juhl C, Bech P, Stenager E, Mellentin A. Prevalence of depressive disorder among patients with fibromyalgia: Systematic review and meta-analysis. J Affect Disord. 2019;245:1098-1105. doi: 10.1016/j.jad.2018.12.001.

58. Habibi M, Salehi P, Jafari F, Azami-Aghdash S, Lumley M. The relationship of alexithymia to pain and other symptoms in fibromyalgia: A systematic review and meta-analysis. Eur J Pain. 2023;27(3):321-337. doi:10.1002/ejp.2064.

59. Gill H, Perez C, Gill B, El-Halabi S, Lee Y, Lipsitz O, Park C, Mansur R, Rodrigues N, McIntyre R, Rosenblat J. The prevalence of suicidal behaviour in fibromyalgia patients. Prog Neuropsychopharmacol Biol Psychiatry. 2021;108:110078. doi:10.1016/j.pnpbp.2020.110078.

60. Adawi M, Chen W, Bragazzi NL, Watad A, McGonagle D, Yavne Y, Kidron A, Hodadov H, Amital D, Amital H. Suicidal behavior in fibromyalgia patients: Rates and determinants of suicide ideation, risk, suicide, and suicidal attempts-A systematic review of the literature and meta-analysis of over 390,000 fibromyalgia patients. Front Psychiatry. 2021;12:629417. doi: 10.3389/fpsyt.2021.629417.

61. Levine D, Horesh D. Suicidality in fibromyalgia: a systematic review of the literature. Front Psychiatry. 2020;11:535368. doi: 10.3389/fpsyt.2020.535368.

62. Galvez-Sánchez CM, Duschek S, Reyes Del Paso GA. Psychological impact of fibromyalgia: Current perspectives. Psychol Res Behav Manag. 2019;12:117-127. doi:10.2147/PRBM.S178240.

63. Izuno S, Yoshihara K, Hosoi M, Eto S, Hirabayashi N, Todani T, Gondo M, Hayaki C, Anno K, Hiwatashi A, Sudo N. Psychological characteristics associated with the brain volume of patients with fibromyalgia. BioPsychoSocial Med. 2023;17(1):36. doi: 10.1186/s13030-023-00293-2.

64. Galvez-Sánchez CM, Reyes del Paso GA, Duschek S. Cognitive impairments in fibromyalgia syndrome: Associations with positive and negative affect, alexithymia, pain catastrophizing and self-esteem. Front Psychol. 2018;9:377. doi:10.3389/fpsyg.2018.00377.

65. Gelonch O, Garolera M, Valls J, Rosselló L, Pifarré J. Cognitive complaints in women with fibromyalgia: Are they due to depression or to objective cognitive dysfunction? J Clin Exp Neuropsychol. 2017;39(10):1013-1025. doi:10.1080/13803395.2017.1301391.

66. Montoro C, Reyes G, Duschek S. Alexithymia in fibromyalgia syndrome. Pers Individ Dif. 2016;102:170-9. doi: 10.1016/j.paid.2016.06.072.

67. Moscati A, Faucon AB, Arnaiz-Yépez C, Lönn SL, Sundquist J, Sundquist K, et al. Life is pain: Fibromyalgia as a nexus of multiple liability distributions. Am J Med Genet B Neuropsychiatr Genet. 2023:1-12. doi: 10.1002/ajmg.b.32949.

68. Treister-Goltzman Y, Peleg R. Fibromyalgia and mortality: A systematic review and meta-analysis. RMD Open. 2023;9(3). doi: 10.1136/rmdopen-2023-003005.

69. Wolfe F, Ablin J, Baker J, Diab R, Guymer E, Littlejohn G, Michaud K, Rasker J, Walitt B, Häuser W. All-cause and cause-specific mortality in persons with fibromyalgia and widespread pain: An observational study in 35,248 persons with rheumatoid arthritis, non-inflammatory rheumatic disorders and clinical fibromyalgia. Semin Arthritis Rheum. 2020;50(6):1457-64. doi:10.1016/j.semarthrit.2020.02.005.

70. Marques A, de Sousa A, Berssaneti A, Matsutani L, King S. Prevalence of fibromyalgia: literature review update. Rev Bras Reumatol. 2017;57(4):356-63. doi: 10.1016/j.rbre.2017.01.005.

71. Macfarlane GJ, Kronisch C, Dean LE, Atzeni F, Häuser W, Fluß E, et al. EULAR revised recommendations for the management of fibromyalgia. Ann Rheum Dis. 2017;76(2):318-28. doi: 10.1136/annrheumdis-2016-209724.

72. Creed F. A review of the incidence and risk factors for fibromyalgia and chronic widespread pain in population-based studies. Pain. 2020;16(6):1169-76. doi: 10.1097/j.pain.0000000000001819.

73. Wolfe F, Walitt B, Perrot S, Rasker J, Häuser W. Fibromyalgia diagnosis and biased assessment: Sex, prevalence and bias. PLoS One. 2018;13(9). doi:10.1371/journal.pone.0203755.

74. Heidari F, Afshari M, Moosazadeh M. Prevalence of fibromyalgia in general population and patients, a systematic review and meta-analysis. Rheumatol Int. 2017;37:1527-1539. doi:10.1007/s00296-017-3725-2.

75. Yunus D, Gamze A, Sevgi C, Yeliz Z, Ayhan B, Ilker I, Omer K. Prevalence of juvenile fibromyalgia syndrome in an urban population of Turkish adolescents: impact on depressive symptoms, quality of life and school performance. Chin Med J (Engl). 2013;126(19):3705-11. doi:10.3760/cma.j.issn.0366-6999.20130185.

76. Coles M, Weissmann R, Uziel Y. Juvenile primary fibromyalgia syndrome: epidemiology, etiology, pathogenesis, clinical manifestations and diagnosis. Pediatr Rheumatol. 2021;19(22). doi: 10.1186/s12969-021-00493-6.

77. Weiss J, Schikler K, Boneparth A, Connelly M. Demographic, clinical, and treatment characteristics of the juvenile primary fibromyalgia syndrome cohort enrolled in the Childhood Arthritis and Rheumatology Research Alliance Legacy Registry. Pediatr Rheumatol. 2019;17(51). doi:10.1186/s12969-019-0356-z.

78. Vittori A, Cascella M, Leonardi M, Monaco F, Nocerino D, Cuomo A, Ottaiano A, Perri F, Mascilini I, Francia E, Petrucci E, Marinangeli F, Picardo S. VOSviewer-Based Bibliometric Network Analysis for Evaluating Research on Juvenile Primary Fibromyalgia Syndrome (JPFS). Children (Basel). 2022;9(5):637. doi:10.3390/children9050637.

79. Coles M, Uziel Y. Juvenile primary fibromyalgia syndrome: A review—treatment and prognosis. Pediatr Rheumatol. 2021;19(74). doi: 10.1186/s12969-021-00529-x.

80. Durán J, Tejos-Bravo M, Cid V, Ferreccio C, Calvo M. Chronic pain in Chile: First prevalence report of noncancer chronic pain, fibromyalgia, and neuropathic pain and its associated factors. Pain. 2023;164(8):1852-9. doi: 10.1097/j.pain.0000000000002886.

81. Goren A, Gross H, Fujii R, Pandey A, Mould-Quevedo J. Prevalência da percepção e do tratamento da dor e de seus resultados de saúde em diferentes condições do Brasil. Rev Dor. 2012;13(4):308-319. doi:10.1590/S1806-00132012000400002.

82. Vega-Hinojosa O, Cardiel M, Ochoa-Miranda P. Prevalence of musculoskeletal manifestations and related disabilities in a Peruvian urban population living at high altitude. COPCORD study. Stage I. Reumatol Clin (Engl Ed). 2018;14(5):278-284. doi: 10.1016/j.reumae.2017.01.013.

83. Pelaez-Ballestas I, Sanin L, Moreno-Montoya J, Alvarez-Nemegyei J, Burgos-Vargas R, Garza-Elizondo M, et al. Epidemiology of the rheumatic diseases in Mexico. A study of 5 regions based on the COPCORD methodology. J Rheumatol. 2011;86:3-8. doi: 10.3899/jrheum.100951.

84. Granados Y, Cedeno L, Rosillo C, Berbin S, Azocar M, Molina M, Lara O, Sanchez G, Peláez-Ballestas I. Prevalence of musculoskeletal disorders and rheumatic diseases in an urban community in Monagas State, Venezuela: A COPCORD study. Clin Rheumatol. 2015;34:871-7. doi:10.1007/s10067-014-2689-9.

85. Londoño J, Peláez-Ballestas I, Cuervo F, Angarita I, Giraldo R, Rueda J, Ballesteros J, Baquero R, Forero E, Cardiel M, Saldarriaga E, Vásquez A, Arias S, Valero L, González C, Ramírez J, Toro C, Santos A. Prevalencia de la enfermedad reumática en Colombia, según estrategia COPCORD-Asociación Colombiana de Reumatología. Estudio de prevalencia de enfermedad reumática en población colombiana mayor de 18 años. Rev Colomb Reumatol. 2018;25(4):245-256. doi: 10.1016/j.rcreu.2018.08.003.

86. Vincent A, Lahr B, Wolfe F, Clauw D, Whipple M, Oh T, Barton D, Sauver J. Prevalence of fibromyalgia: a population-based study in Olmsted County, Minnesota, utilizing the Rochester Epidemiology Project. Arthritis Care Res (Hoboken). 2013;65(5):786-92. doi:10.1002/acr.21896.

87. Jones G, Beasley M, Atzeni F, Fluss E, Sarzi-Puttini P, Macfarlane G. The prevalence of fibromyalgia in the general population-a comparison of the ACR 1990, 2010 and modified 2010 classification criteria. Arthritis Rheumatol. 2013;65(S10). doi: 10.1002/art.38216.

88. Branco J, Bannwarth B, Failde I, Carbonell J, Blotman F, Spaeth M, Saraiva F, Nacci F, Thomas E, Caubere J, Lay K, Taieb C, Matucci-Cerinic M. Prevalence of fibromyalgia: A survey in five European countries. Semin Arthritis Rheum. 2010;39(6):448-53. doi: 10.1016/j.semarthrit.2008.12.003.

89. Zhang Y, Liang D, Jiang R, Ji X, Wang Y, Zhu J, Zhang J, Huang F. Clinical, psychological features and quality of life of fibromyalgia patients: a cross-sectional study of Chinese sample. Clin Rheumatol. 2018;37:527-37. doi:10.1007/s10067-017-3872-6.

90. Mazo J, Estrada M. Implications of chronic pain on the quality of life of women with fibromyalgia. Psicologia em Estudo. 2018;23. doi: 10.4025/psicolestud.v23.e38447.

91. Fernandez-Feijoo F, Samartin-Veiga N, Carrillo-de-la-Peña MT. Quality of life in patients with fibromyalgia: Contributions of disease symptoms, lifestyle and multi-medication. Front Psychol. 2022;13:924405. doi:10.3389/fpsyg.2022.924405.

92. Choy EH. The role of sleep in pain and fibromyalgia. Nat Rev Rheumatol. 2015;11(9):513-20. doi: 10.1038/nrrheum.2015.56.

93. Cöster L, Kendall S, Gerdle B, Henriksson C, Henriksson K, Bengtsson A. Chronic widespread musculoskeletal pain – A comparison of those who meet criteria for fibromyalgia and those who do not. Eur J Pain. 2012;12:600-10. doi: 10.1016/j.ejpain.2007.10.001.

94. Mukhida K, Carroll W, Arseneault R. Does work have to be so painful? A review of the literature examining the effects of fibromyalgia on the working experience from the patient perspective. Can J Pain. 2020;4(1):268-86. doi: 10.1080/24740527.2020.1820858.

95. Laroche F, Azoulay D, Trouvin AP, Coste J, Perrot S. Fibromyalgia in the workplace: risk factors for sick leave are related to professional context rather than fibromyalgia characteristics - a French national survey of 955 patients. BMC Rheumatol. 2019;3(44). doi: 10.1186/s41927-019-0089-0.

96. D'Onghia M, Ciaffi J, Ruscitti P, Cipriani P, Giacomelli R, Ablin JN, Ursini F. The economic burden of fibromyalgia: a systematic literature review. Semin Arthritis Rheum. 2022;56:152060. doi: 10.1016/j.semarthrit.2022.152060.

97. Gharibpoor F, Nasrollahzadeh E, Ghavidel-Parsa B, Ghaffari ME, Bidari A. High cost of illness in fibromyalgia patients in Iran, irrespective of disease severity: A prospective cost study. Int J Rheum Dis. 2021;24(5):671-680. doi:10.1111/1756-185X.14094.

98. Montesó-Curto P, Cubí-Guillen MT, Lladser Navarro AN, Puig Llobet M, Toussaint L. Family perceptions and experiences of living with patients with fibromyalgia syndrome. Disabil Rehabil. 2022;44(20):5855-62. doi: 10.1080/09638288.2021.1948620.

99. Lozano JE, Leal T, Peña-Altamar M, Olivera S, Núñez N. Depresión, ansiedad, apoyo interpersonal y dolor autopercibido en pacientes con síndrome de fibromialgia. Diversitas: Perspectivas en Psicología. 2020;16(2):399-411. doi: 10.15332/22563067.5007.

100. Brooks BD, Kaniuka AR, Rabon JK, Sirois FM, Hirsch JK. Social support and subjective health in fibromyalgia: self-compassion as a mediator. J Clin Psychol Med Settings. 2022;29:375-83. doi: 10.1007/s10880-021-09832-x.

101. Huang ER, Jones KD, Bennett RM, Hall GCN, Lyons KS. The role of spousal relationships in fibromyalgia patients' quality of life. Psychol Health Med. 2018;23(8):987-995.

102. Sanabria-Mazo JP, Gers-Estrada M. Implications of chronic pain on the quality of life of women with fibromyalgia. Psicologia em Estudo. 2020;23. doi: 10.4025/psicolestud.v23.e38447.

103. Gower C, Trevitt J, Cherry BJ, Zettel-Watson L. Distress as a mediator for pain and activities of daily living in older adults with fibromyalgia. Front Med. 2022;9:1033936. doi:10.3389/fmed.2022.1033936.

104. Dueñas M, Salazar A, de Sola H, Failde I. Limitations in activities of daily living in people with chronic pain: Identification of groups using cluster analysis. Pain Pract. 2020;20(2):179-87. Available from: https://pubmed.ncbi.nlm.nih.gov/31556216/.

105. Kramer S, Deuschle L, Kohls N, Offenbächer M, Winkelmann A. The Importance of Daily Activity for Reducing Fibromyalgia Symptoms: A Retrospective "Real World" Data Comparison of two Multimodal Treatment Programs. Arch Rheumatol. 2020;35(4):575–583. doi: 10.46497/ArchRheumatol.2021.7739.

106. Segura-Jiménez V, Estévez-López F, Soriano-Maldonado A, Álvarez-Gallardo IC, Delgado-Fernández M, Ruiz JR, Aparicio VA. Gender differences in symptoms, health-related quality of life, sleep quality, mental health, cognitive performance, pain-cognition, and positive health in Spanish fibromyalgia individuals: The Al-Ándalus project. Pain Res Manag. 2016;2016:5135176. doi: 10.1155/2016/5135176.

107. Ataoğlu S, Ankaralı H, Ankaralı S, Ataoğlu BB, Ölmez SB. Quality of life in fibromyalgia, osteoarthritis and rheumatoid arthritis patients: Comparison of different scales. Egypt Rheumatol. 2018;40(3):203-8. doi: 10.1016/j.ejr.2017.09.007.

108. North J, Hong K-S, Rauck R. The effect of a novel form of extended-release gabapentin on pain and sleep in fibromyalgia subjects: an open-label pilot study. Pain Pract. 2016;16:720-9. doi: 10.1111/papr.12319.

109. Arnold L, Choy E, Clauw D, Oka H, Whalen E, Semel D, Pauer L, Knapp L. An evidence-based review of pregabalin for the treatment of fibromyalgia. Curr Med Res Opin. 2018;34(8):1397-409. doi: 10.1080/03007995.2018.1450743.

110. Farag HM, Yunusa I, Goswami H, Sultan I, Doucette JA, Eguale T. Comparison of amitriptyline and US Food and Drug Administration-approved treatments for fibromyalgia: A systematic review and network meta-analysis. JAMA Netw Open. 2022;5(5). doi:10.1001/jamanetworkopen.2022.12939.

111. Dias Á, Eberle L, Alves T, da Silva T. Comparing the efficacy and safety of duloxetine and amitriptyline in the treatment of fibromyalgia: overview of systematic reviews. Adv Rheumatol. 2020;60(35). doi: 10.1186/s42358-020-00137-5.

112. Gupta H, Girma B, Jenkins JS, Kaufman SE, Lee CA, Kaye AD. Milnacipran for the treatment of fibromyalgia. Health Psychol Res. 2021;9(1):25532. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8567778/.

113. Lederman S, Arnold LM, Vaughn B, Kelley M, Sullivan GM. Efficacy and Safety of Sublingual Cyclobenzaprine for the Treatment of Fibromyalgia: Results From a Randomized, Double-Blind, Placebo-Controlled Trial. Arthritis Care Res. 2023;75(11):2359-2368. doi: 10.1002/acr.25142.

114. Pereira A, Christianini C, Pereira AC, da Silva AG, Civile V, Moça VF. Tramadol for management of fibromyalgia pain and symptoms: Systematic review. Int J Clin Pract. 2020;74(3). doi: 10.1111/ijcp.13455.

115. Welsch P, Üçeyler N, Klose P, Walitt B, Häuser W. Serotonin and noradrenaline reuptake inhibitors (SNRIs) for fibromyalgia. Cochrane Database Syst Rev. 2018;(2). doi:10.1002/14651858.CD010292.pub2.

116. Tzadok R, Ablin JN. Current and emerging pharmacotherapy for fibromyalgia. Pain Res Manag. 2020;2020:6541798. doi: 10.1155/2020/6541798.

117. Taylor SJ, Steer M, Ashe SC, Furness PJ, Haywood-Small S, Lawson K. Patients' perspective of the effectiveness and acceptability of pharmacological and non-pharmacological treatments of fibromyalgia. Scand J Pain. 2019;19(1):167-181. doi: 10.1515/sjpain-2018-0116.

118. Luciano J, Neblett R, Peñacoba C, Suso-Ribera C, McCracken L. The contribution of the psychologist in the assessment and treatment of fibromyalgia. Curr Treat Options Rheum. 2023;9:11-31. doi: 10.1007/s40674-023-00200-4.

119. Thieme K, Mathys M, Turk D. Evidenced-based guidelines on the treatment of fibromyalgia patients: are they consistent and if not, why not? Have effective psychological treatments been overlooked? J Pain. 2017;18(7):747-756. doi: 10.1016/j.jpain.2016.12.006.

120. Heller H, Borges A, Franco L, Aucelio J, Vargas M, Lorga R, Sales M, Nascimento N, Netto G, Passos B, Paes B, Mendes B, Lyra B, Santos C, Santos G, Oliveira M, Silva M, Jesus M, Storni P, Reis A. Role of cognitive behavioral therapy in fibromyalgia: A systematic review. Open J Rheumatol Autoimmun Dis. 2021;11(4):169-187. doi:10.4236/ojra.2021.114018.

121. Chan J, Lazaridou A, Paschali M, Loggia ML, Berry MP, Ellingsen DM, Isenburg K, Anzolín A, Grahl A, Wasan A, Napadow V, Edwards R. A randomized controlled neuroimaging trial of cognitive behavioral therapy for fibromyalgia pain. Arthritis Rheumatol. 2023;76(1):130-40. doi: 10.1002/art.42672.

122. Zabihiyeganeh M, Afshar SV, Kadijani AA, Jafari D, Bagherifard A, Janbozorgi M, Akbari A, Mirzaei A. The effect of cognitive behavioral therapy on the circulating proinflammatory cytokines of fibromyalgia patients: A pilot controlled clinical trial. Gen Hosp Psychiatry. 2019;57:23-8. doi:10.1016/j.genhosppsych.2019.01.003.

123. Kong KR, Lee EN. Effects of a Cognitive Behavior Therapy Program for Patients with Fibromyalgia Syndrome: A Randomized Controlled Trial. J Korean Acad Nurs. 2021;51(3):347-362. doi: 10.4040/jkan.21025.

124. Bernardy K, Klose P, Welsch P, Häuser W. Efficacy, acceptability and safety of internet-delivered psychological therapies for fibromyalgia syndrome: A systematic review and meta-analysis of randomized controlled trials. Eur J Pain. 2019;23(1):3-14. doi: 10.1002/ejp.1284.

125. Eastwood F, Godfrey E. The efficacy, acceptability and safety of acceptance and commitment therapy for fibromyalgia–a systematic review and meta-analysis. Br J Pain. 2023;20494637231221451. doi:10.1177/20494637231221451.

126. Akbarian M, Mohammadi Shirmahleh F, Borjali A, Hasanabadi H, Abolghasemi S. Effect of acceptance and commitment therapy on depression, chronic fatigue, and pain intensity in patients with fibromyalgia syndrome: A study with expectancy effect. Int Med Today. 2021;28(1):70-85. Available from: http://imtj.gmu.ac.ir/article-1-3684-en.html.

127. Aman M, Jason-Yong R, Kaye A, Urman R. Evidence-based non-pharmacological therapies for fibromyalgia. Curr Pain Headache Rep. 2018;22(33). doi: 10.1007/s11916-018-0688-2.

128. Van Gordon W, Shonin E, Dunn T, Garcia-Campayo J, Griffiths M. Meditation awareness training for the treatment of fibromyalgia syndrome: A randomized controlled trial. Br J Health Psychol. 2017;22(1):186-206. doi: 10.1111/bjhp.12224.

129. Pleman B, Park M, Han X, Price L, Bannuru R, Harvey W, Driban J, Wang C. Mindfulness is associated with psychological health and moderates the impact of fibromyalgia. Clin Rheumatol. 2019;38(6):1737-1745. doi: 10.1007/s10067-019-04436-1.

130. Park M, Zhang Y, Price L, Bannuru R, Wang C. Mindfulness is associated with sleep quality among patients with fibromyalgia. Int J Rheum Dis. 2020;23(3):294-301. doi: 10.1111/1756-185X.13756.

131. Andrés-Rodríguez L, Borràs X, Feliu-Soler A, Pérez-Aranda A, Rozadilla-Sacanell A, Montero-Marin J, Maes M, Luciano J. Immune-inflammatory pathways and clinical changes in fibromyalgia patients treated with mindfulness-based stress reduction (MBSR): A randomized, controlled clinical trial. Brain Behav Immun. 2019;80:109-19. doi: 10.1016/j.bbi.2019.02.030.

132. Galvez-Sánchez C, Montoro C. Psychoeducation for fibromyalgia syndrome: A systematic review of emotional, clinical and functional related-outcomes. Behav Sci. 2023;13(5):415. doi:10.3390/bs13050415.

133. Conversano C, Poli A, Ciacchini R, Hitchcott P, Bazzichi L, Gemignani A. A psychoeducational intervention is a treatment for fibromyalgia syndrome. Clin Exp Rheumatol. 2019;37(116). Available from: https://pubmed.ncbi.nlm.nih.gov/30747101/.

134. Romeo A, Tesio V, Ghiggia A, Di Tella M, Perutelli V, Castelli L. The efficacy of Brief Psychodynamic Psychotherapy for fibromyalgia: a pilot study. Psychother Psychosom. 2019;88(Suppl 1):110-110. Available from: https://hdl.handle.net/11368/3067225.

135. Farzadkia M, Farhangi A, Abolghasemi S. Comparing the effectiveness of mindfulness-based stress reduction and intensive short-term dynamic psychotherapy in reducing intolerance of uncertainty and depression in women with fibromyalgia. Womens Health Bull. 2023;10(1):44-51. doi:10.30476/whb.2023.97334.1206.

136. Aravena V, García FE, Téllez A, Arias PR. Hypnotic intervention in people with fibromyalgia: A randomized controlled trial. Am J Clin Hypn. 2020;63(1):49-61. doi: 10.1080/00029157.2020.1742088.

137. De Benedittis G. The challenge of fibromyalgia efficacy of hypnosis in alleviating the invisible pain: A narrative review. Int J Clin Exp Hypn. 2023;71(4):276-96. doi: 10.1080/00207144.2023.2247443.

138. Häuser W, De Benedittis G. Hypnosis and fibromyalgia syndrome. In: The Routledge International Handbook of Clinical Hypnosis. Routledge; 2024. p. 640-649.

139. Caballol-Angelats R, Gonçalves AQ, Aguilar Martín C, Sancho Sol MC, González Serra G, Casajuana M, Carrasco-Querol N, Fernández-Sáez J, Dalmau Llorca MR, Abellana R, Berenguera A, SensiTEbre group. Effectiveness, cost-utility, and benefits of a multicomponent therapy to improve the quality of life of patients with fibromyalgia in primary care: A mixed methods study protocol. Medicine. 2019;98(41). doi: 10.1097/MD.0000000000017289.

140. Arfuch VM, Gonçalves AQ, Caballol-Angelats R, Aguilar-Martin C, Carrasco-Querol N, Sancho-Sol M, González-Serra G, Fusté-Anguera I, Berenguera A. Patients' appraisals about a multicomponent intervention for fibromyalgia syndrome in primary care: A focus group study. Int J Qual Stud Health Well-being. 2021;16(1). doi: 10.1080/17482631.2021.2005760.

141. Zhang XC, Chen H, Xu WT, Song YY, Gu YH, Ni GX. Acupuncture therapy for fibromyalgia: a systematic review and meta-analysis of randomized controlled trials. J Pain Res. 2019;12:527-42. doi:10.2147/JPR.S186227.

142. Lee J, Park SH, Ju J, Cho J. Application of a real-time pain monitoring system in Korean fibromyalgia patients: A pilot study. Int J Rheum Dis. 2019;22:934-939. doi: 10.1111/1756-185X.13472.

143. Llàdser AN, Montesó-Curto P, López C, Rosselló L, Lear S, Toussaint L, et al. Multidisciplinary rehabilitation treatments for patients with fibromyalgia: a systematic review. Eur J Phys Rehabil Med. 2022;58(1):76-84. doi: 10.23736/S1973-9087.21.06432-7.

144. Amable-Ambrós Z, Perojo V. Políticas públicas desde la visión sanológica. In: Acosta-Sariego J, editor. Bioética y Biopolítica. Publicaciones Acuario; 2023. p. 656-66.

145. Rodríguez A, Casas D, Contreras G, Ruano L. De la enfermología a la salutogénesis: conceptos teóricos en la búsqueda de la salud como derecho universal. Rev Med Univ Costa Rica. 2016;9(2):1-8. doi: 10.15517/rmu.v9i2.21988.

146. Sánchez-Piedrahita L, Amable-Ambrós Z, Núñez N. Calidad de vida de las personas con alteraciones mentales que asisten al “Hospital Día” con estrategia sanológica. Psiquiatria.com. 2021;25:1-17. Available from: http://psiqu.com/1-10718.

147. Reyes-Gaspar P, Charry-Méndez S. Efecto de un programa de ejercicio físico con enfoque sanológico en población universitaria. Retos. 2024;51:267-274. doi: 10.47197/retos.v51.99354.

148. Cabrera-Díaz E, Reyes-Gaspar P, Charry-Méndez S. Efectos de un programa de ejercicio físico con enfoque sanológico en universitarios. Med UPB. 2024;43(1):11-21. doi: 10.18566/medupb.v43n1.a03.

149. Sánchez-Piedrahita L, Ostos H, Barreiro F, Núñez N. Estrategia sanológica en madres cuidadoras de hijos con discapacidad genética (conferencia). In: Convención Internacional de Salud, Cuba Salud 2018; La Habana, Cuba. 2018 Jan. Available from: http://www.convencionsalud2018.sld.cu/index.php/connvencionsalud/2018/paper/viewFile/822/891.

150. Basain J, Valdés M. La salud física y la neuroplasticidad como elementos preventivos en el estado de bienestar humano. GADE: Rev Cient. 2023;3(2):282-96. Available from: https://dialnet.unirioja.es/servlet/articulo?codigo=8946770.

Conflict of Interest

The authors declare that there is no conflict of interest.

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