

A psychoeducational intervention is a treatment for fibromyalgia syndrome

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ABSTRACT

Although the mechanisms underlying fibromyalgia are not yet clear, many attempts have been made to implement pharmacological therapy and help patients manage its psychological and physical symptoms. Recent evidence has shown that an interdisciplinary multidimensional approach encompassing psychological factors, emotion regulation strategies and education on illness is more effective in improving quality of life, both in the short- and long-term, than usual treatments alone. The purpose of this review is to provide an updated overview of the available literature regarding the role of psychoeducation on fibromyalgia symptoms and health outcomes.

We searched on PubMed Database with the keywords “fibromyalgia”, “education” and “psychology” and then divided the results of our research into four main categories: effectiveness of psychoeducational programs versus treatment as usual, psychoeducational interventions versus other non-pharmacological treatments, Online-based education programs and specific characteristics of the participants. Our research highlighted that most of the considered studies found significant positive results on patients’ condition, suggesting that an interdisciplinary intervention containing psychoeducation is an effective strategy in managing fibromyalgia symptoms.

Introduction

Fibromyalgia (FM) is a widespread chronic pain syndrome exhibiting spontaneous pain without external stimuli and is characterised by augmented sensitivity to painful stimuli as well as non-painful stimuli (hyperalgesia and allodynia, respectively). Although the pathophysiological processes of FM

pain are not well-understood, recent neuroimaging evidence shows that the development and maintenance of FM syndrome are associated with increased central nervous system processing (1, 2). FM has a prevalence of approximately 2% in the general population and is the third most common diagnosis in clinical rheumatology (3), but its definition, aetiology, pathogenesis and diagnosis remain a matter of controversy (4). Neuroimaging studies have observed disruptions of the resting state network in FM (5, 6), however, as yet, neither blood tests or imaging modalities are useful for diagnosing FM and it is diagnosed purely on a clinical basis. Whereas some authors argue that FM should be diagnosed based on the exclusion of other disorders (7), others have questioned whether FM truly exists as a separate disease entity (8). Diagnostic criteria for fibromyalgia have changed over time (9, 10), the most recent of which (ACR 2010) were revised by Wolfe *et al.* in 2016 (11). It is now generally believed that FM is a disorder requiring positive diagnosis, rather than one based solely on exclusion criteria (12), and a widely accepted concept is that FM is a multifactorial disease. Accordingly, it is best understood from a biopsychosocial perspective (13), and requires a multidisciplinary intervention approach, rather than confined biomedical treatment (14). As a dimensional disorder (15), assessing disease severity states using self-administered questionnaires designed for the evaluation of multidimensional aspects of FM can help guide decision-making and treatment evaluation (16). Regarding pharmacological treatment, several drugs have been proposed as treatments for FM. Recommended therapies for pain management, including acetaminophen, nonsteroidal anti-inflammatory

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drugs, and stimulators of the pain inhibitory pathway, have shown incomplete efficacy and potential toxicities that can limit their utility. Although antidepressants (including amitriptyline and selective serotonin reuptake inhibitors) were found to be helpful in treating mood disorders in several trials, they were ineffective in counteracting pain or sleep dysfunction. Mirtazapine, a noradrenergic and specific serotonergic antidepressant, has been shown to be effective in reducing pain and improving quality of life, in patients without concomitant depression. Anti-psychotic drugs, like quetiapine, have limited efficacy in reducing pain, sleeping problems, depression and anxiety in FM patients with major depression. In clinical trials, Mirogabalin, a gabapentinoid, has shown promise for the treatment of peripheral neuropathic pain. The neuronal pathogenesis of FM would suggest the use of muscle relaxants, dopaminergic agonists, memantine, neurotrophin, opioid blockers and cannabinoids, but the available data are still controversial (17). Each of these pharmacotherapies has shown incomplete efficacy, while non-pharmacological interventions have demonstrated efficacy that rivals or surpasses pharmacological therapies in the control of pain and improving function in a variety of rheumatic disorders, including FM (18).

Here, we review the utility of a multidisciplinary approach, the importance of psychoeducation in the management of pain, and the effects of the main non-pharmacological therapies on FM treatment available.

A multidisciplinary approach to FM: the importance of psychoeducation

It is now widely acknowledged that a multidimensional diagnostic approach encompassing somatic complaints, psychological factors, psychosocial stressors and subjective beliefs is more appropriate (10, 19). The above issues were considered and integrated in the three evidence-based multidisciplinary guidelines for the diagnosis and management of FM (20, 21). All three guidelines also emphasise the importance of psychiatric comorbidity. It has been shown that psychiatric disorders

are quite common in FM, may worsen health-related quality of life (22), and that they may have more influence on the sexual satisfaction of FM patients than the presence of the rheumatic disease itself (23). In addition, transdiagnostic factors such as sleep loss may be shared by mental disorders, sleep disturbances and pain in FM and it may explain, in part, the high levels of comorbidity between them (24). Accordingly, screening for mental disorders (*i.e.* anxiety and mood disorders) is highly recommended during initial evaluation and recent evidence has shown that depressive symptoms are increased in FM (25, 26). Since sleep loss is related to the activation of the stress and immune systems, the inflammatory hypothesis of mood disorders has been broadened to include fibromyalgia (27). High levels of alexithymia and type D personality have been reported in FM patients but these traits are eliminated after controlling for depressive symptomatology (28). Furthermore, recent studies show that fibromyalgic patients with PTSD report more potentially traumatic events, avoidance symptoms, numbing, arousal, maladaptive coping and personality characteristics compared either to healthy controls or patients with partial PTSD (29, 30). Overall, such evidence highlights the importance of non-pharmacological interventions (31) and of psychological variables in FM (32).

Different therapies and effects on treatment

Recent evidence has shown that mindfulness-based stress reduction results in improvements in pain immediately post-treatment when compared with either usual treatment or active control interventions (33), while cupping therapy is not recommended (34). Cognitive-behavioural therapy has also been shown to be effective in reducing pain and disability at the end of treatment, compared with a variety of control conditions, and these results are sustained long-term (35). Concerning exercise interventions, aerobic exercise is associated with improvements in pain, physical function (36) and health-related quality of life (37), though these effects may not be long-lasting (38).

Similarly, resistance training results in a significant improvement in pain as well as function, compared with control (39). Management of pain involving both educational or psychological therapies and exercise was effective in reducing pain and fatigue, immediately post treatment, compared with waiting list, relaxation, treatment as usual and education (40). Within an occupational therapy framework, activities categorised as cognitive-behavioural interventions, relaxation and stress management, emotional disclosure, physical activity and multidisciplinary interventions for improving daily living, pain, depressive symptoms, and fatigue were found the most effective (41). Psychoeducational and exercise approaches have the greatest evidence of efficacy among non-pharmacological therapies (42), but they need to be tailored to the individual (43). Clinical evidence suggests that three distinct FM patient subgroups may exist: a group of FM patients who exhibit extreme tenderness but lack any associated psychological/cognitive factors; an intermediate group who display moderate tenderness and have normal mood; and a group in whom mood and cognitive factors may be significantly influencing the symptom report) (44). Each subgroup may need a personalised approach in accordance with their individual clinical characteristics (pain, catastrophising levels, etc.) (44).

Education and reassurance is the conventional first step in treating the patient with FM. This involves information about the nature of FM, possible causes and contributing factors, and the treatments that are most safe and effective. FM is a real chronic condition (45) with an underlying pathology. Many, if not most, medical illnesses struggle for credibility until the underlying pathogenesis is identified and better understood. One of the reasons that many healthcare providers are skeptical about the legitimacy of FM as a genuine condition is that they are unaware of the plethora of neuroimaging (46, 47) and other evidence that confirms FM to be an actual disease. Education also involves discussion of the distinction between acute and chronic pain.

Whereas acute pain is correctly viewed as a signal of ‘harm’ or potential damage or danger to the body, chronic pain is often incorrectly viewed in the same way. Patients must be informed that the goal of treatment is not to cure FM, but rather to reduce symptom severity and their impact on quality of life and general well-being (48). Skepticism about the legitimacy of FM is not helpful in providing a timely diagnosis. Currently, patients with FM may wait years before being diagnosed, seeing numerous specialists. Delayed diagnosis negatively impacts activities of daily living and quality of life (49, 50), and less than half of patients with newly diagnosed FM are advised to initiate an exercise program as part of their treatment plan, despite evidence that exercise is beneficial for patients with FM (51) and recommended in a primary care setting (52). Notwithstanding the skepticism of healthcare providers, there is evidence that a management framework like the patient-centered medical home (PCMH), that has been successfully implemented in other chronic diseases, might improve the care of patients with FM in primary care, by bringing together a team of professionals with a range of skills and training. The objective of PCMH is to have a centralised setting that facilitates partnerships between individual patients and their personal physicians. When appropriate, the patient’s family are included. Care is facilitated by registries, information technology, health information exchange and other means to ensure that patients receive indicated care where and when needed/wanted, in a culturally and linguistically appropriate manner (53, 54). Thus, the purpose of this review is to provide an updated overview on the available literature regarding the role of psychoeducation on FM symptomatology and quality of life.

Methods

We searched the PubMed Database using the following keywords: “Fibromyalgia” AND “Education” AND “Management” and “Psychology” AND “Education” AND “Fibromyalgia” finding a total of 639 items. From the total of the articles found, we excluded: 1. de-

Table I. Table of the considered studies.

| Study | Year | Design | Sample |
|---------------------------------|------|------------------|---|
| Melin <i>et al.</i> | 2018 | Pilot | 36 patients on sick-leave due to depression, anxiety, or FM |
| Lumley <i>et al.</i> | 2017 | RCT | 230 FM patients |
| Martin <i>et al.</i> | 2017 | RCT | 138 FM patients |
| Garrido-Torres <i>et al.</i> | 2016 | Pre-Post | 32 FM patients |
| Feliu-Soler <i>et al.</i> | 2016 | RCT | 180 FM patients |
| Saral <i>et al.</i> | 2016 | RCT | 66 FM patients |
| Bourgault <i>et al.</i> | 2015 | Mixed-Method RCT | 58 FM patients |
| Luciano <i>et al.</i> | 2013 | RCT | 216 FM patients |
| Castel <i>et al.</i> | 2013 | RCT | 155 FM patients |
| Camerini <i>et al.</i> | 2013 | Cross-sectional | 209 FM patients |
| Van Eijk-Hustings <i>et al.</i> | 2013 | RCT | 203 FM patients |
| Kim <i>et al.</i> | 2012 | Cohort | 477 FM patients |
| Oh <i>et al.</i> | 2012 | Cohort | 536 FM patients |
| Camerini & Schulz | 2012 | Pre-Post | 165 FM patients |
| Hamnes <i>et al.</i> | 2012 | RCT | 150 FM patients |
| Jones <i>et al.</i> | 2012 | RCT | 101 FM patients |
| Van Ittersum <i>et al.</i> | 2011 | Cohort | 41 FM patients |
| Hamnes <i>et al.</i> | 2011 | Qualitative | 8 FM patients, 8 rheumatoid arthritis patients |
| Luciano <i>et al.</i> | 2011 | RCT | 216 FM patients |
| Carbonell-Baeza <i>et al.</i> | 2011 | RCT | 75 FM patients |
| Wang <i>et al.</i> | 2010 | RCT | 66 FM patients |

scriptive studies and 2. single case studies, 3. research without a psychoeducational component or information about the disease, 4. reviews. We included only those articles written in English or Italian and which were published in the last ten years. At the end of our research we selected 21 articles, shown in Table I, that we analysed for our review.

Results

The selected experimental studies included a variety designs such as: randomised controlled trials, studies with pre-post measurements, cohort studies, qualitative studies, mixed method studies and pilot studies.

Among the selected articles, some of the studies investigated the effectiveness of an intervention based on psychoeducation, in relation to psychological variables and factors related to pain in fibromyalgia. Others compared multiple interventions, including classic interventions and modern multidisciplinary programs, with an educational component. We also noted that some studies have concerned online interventions both in terms of their creation and impact on health outcomes; others, have considered which patient characteristics are associated with positive responses to the psychoeducational in-

tervention and the specific role of education in improving quality of life and patient’s management of the disease.

Effectiveness of psychoeducational programs vs. treatment as usual

Luciano *et al.* (55) demonstrated that a psychoeducational intervention in fibromyalgic patients produces a significantly greater improvement when compared to a standard treatment. The experimental group attended 9 meetings incorporating psychoeducation and relaxation techniques, called autogenic training. The results demonstrated a positive effect of the education intervention for fibromyalgia patients and suggested an improvement of functional status when compared with usual care that was not explained by social desirability bias.

The pilot study of Melin *et al.* (56) concerned a psychoeducational intervention, called ASSA, aimed at people on sick-leave due to fibromyalgia. The intervention aimed to educate patients in emotion recognition, to increase awareness of experience and to develop active listening with the primary goal of identifying alternative strategies for managing emotions. The results indicated good adherence to the intervention and a significant improvement, that

was maintained even after 18 months. Long-term efficacy of psychoeducation for fibromyalgia patients was also observed in the study by Luciano *et al.* (57) with improvements in physical functioning, perceived pain and depression levels even 12 months post-intervention. The research also demonstrated the cost effectiveness of this non-pharmacological intervention in comparison with usual care alone.

Similarly, Bourgault *et al.* (58) studied the efficacy of a psychoeducational intervention, with CBT-related techniques and exercise activity (PASSAGE program) on fibromyalgic patients, finding improvements both in the short- and long-term (after 6 and 12 months). Improvements in patients' impressions of pain, perceived quality of life and self-management of the illness were highlighted.

Hannes *et al.* (59) evaluated the effect of a multidisciplinary inpatient self-management program (SMP) targeting psychological distress, self-efficacy and consequences of fibromyalgia. This intensive program teaches participants, using cognitive behavioural techniques, addressing personal effectiveness, coping styles related to the disease and its daily management and personal empowerment. As pointed out by authors themselves, there was little improvement in the variables under examination, probably due to the brevity of the intervention and the lack of long-term control over the effects.

Carbonell-Baeza *et al.* (60) tested a multidisciplinary intervention, based on the biopsychosocial model and on acceptance and commitment therapy, that included a psychoeducational component. Improvements in participants' sense of fatigue and stiffness, anxiety and depression and quality of life were reported.

Individuals can receive disease education in many ways, including a paper format. In the study of Van Ittersum and collaborators (61), a pamphlet containing information on neurophysiological mechanisms and the process of central sensitisation was delivered to the experimental group. Particular attention was given to information on fibromyalgia, describing it as an adaptive disease of

the nervous system to the pain process. Furthermore, data on biopsychosocial pain maintenance mechanisms and cognitive deficits caused by the disease were provided. No significant changes in the subjective perception of the disease, tendency for catastrophisation and the perceived state of health were found. This may indicate that the provision of education/information alone is insufficient to produce stable therapeutic change in patients.

Regarding the effectiveness of face-to-face educational interventions, in the only qualitative study found, Hannes *et al.* (62) conducted semi-structured interviews to investigate the expectations of patients with fibromyalgia (and rheumatoid arthritis) about the self-management program (SMP). The authors stressed the importance of constructing the intervention based on the expectations/wishes/interests of the participants, emphasising the benefits of focusing on the active acceptance of the disease and its consequences, as well as participant interaction/exchange. More in general, Camerini *et al.* (63) investigated the role of health education and empowerment on patients' self-management and health outcomes by finding, through a cross-sectional analysis, a positive impact on patients' health.

The psychoeducation intervention, when compared with treatment as usual, proved to be capable of improving functional, physical, emotional and psychological status of fibromyalgic patients; furthermore, those positive results highlight its importance both in the short- and long-term, suggesting that this intervention may play a fundamental role in improving patients quality of life.

Psychoeducational interventions vs. other non pharmacological treatments

Saral *et al.* (64) compared the results from two experimental conditions and one control group. Both experimental groups received an interdisciplinary program comprising cognitive behavioural therapy, exercise training and educational program. This was delivered in either long-term or intensive formats. Both intervention formats were effective in reducing pain intensity and

tender point number; moreover, the authors found an increased pain management skill in participants. Long-term treatment was more effective in reducing fatigue severity, but, more generally, was not effective in improving depressive symptoms or sleep quality. The Lumley research group (65) conducted a randomised study comparing a classic CBT-based intervention with an intervention of active education and an innovative intervention called EAET. The conclusions showed that, in general, providing a new conceptual model of the patient's illness results in an effective strategy and facilitates the expression of initially avoided emotional experiences. Comparison of the interventions indicated superiority of the EAET intervention compared to classical psychoeducation.

The EUDAIMON study (66) compared the economic and biological effects of two interventions, one based on mindfulness for stress reduction (MBSR), the other a psychoeducation intervention. These were administered to a group of patients who continued to take treatment as usual and compared with a second group who received therapy as usual without intervention. The results will include an analysis of pre-/post-intervention differences in brain structure and function and inflammatory markers, from which it will be possible to evaluate the different dimensions in which the interventions taken into consideration operate.

Two studies focused on comparing an intervention containing psychoeducation and an intervention based on tai chi (67, 68).

The one by Jones *et al.* (68) found improvements in fibromyalgia impact scores, pain severity and interference, quality of sleep and self-efficacy for pain control. Similarly, Wang *et al.* (67) compared a Tai chi intervention with an interdisciplinary psychoeducational intervention, finding benefits in measurements, including levels of perceived pain, quality of life, quality of sleep, depression and a positive impact on the subjective impact of fibromyalgia on the patient.

Several interventions were studied by Van Eijk-Hustings *et al.* (69), includ-

ing a multidisciplinary intervention with aftercare and aerobic exercise. Despite mixed statistical outcomes they concluded that the multidisciplinary intervention could improve health leave, contact with general practitioners and specialists. The majority of Psychoeducational interventions examined, were shown to be equally as effective as other non pharmacological treatments, and, in some cases, able to improve pain management skills and health leave.

Online based education programs

Some of the selected studies used specific websites to provide psychoeducation to patients. In designing eHealth interventions, Camerini *et al.* (70) demonstrated the importance of personalised contents in improving the effectiveness of systems. The examined system is called ONESELF, an online intervention focused on improving the self-management of the disease. It aimed and manage to increase awareness and knowledge about fibromyalgia and empower participants through social support. Particularly, the more the components of the intervention were designed and approved by the user before doing it, the more they impacted the patient's knowledge about the disease by improving the health outcome. The study by Garrido-Torres *et al.* (71), compared the effectiveness of a mindfulness-based platform with mindfulness sessions provided onsite. Significant improvements were observed in both groups and both interventions were similarly effective. Specifically, the outcomes showed improvements in anxiety symptoms and in the management of pain.

Contrary to common thought, online psychoeducational intervention has proved to be effective, especially in improving patient's knowledge of the disease, health outcomes and psychological variables.

Specific characteristics of the participants

Oh *et al.* (72) investigated traits of patients related to positive outcomes following a brief interdisciplinary fibromyalgia treatment program (FTP). The characteristics taken into consideration

included age, gender, marital status, employment, education level, tender points, smoking and possible abuse history. Results show that younger age, higher level of education, higher baseline depression score and lower tender point number were associated with greater benefit from the educational intervention. On the contrary, the other characteristics did not seem to play a significant role on treatment outcome. Martin *et al.* (73) studied the impact of a number of variables on the outcome of an interdisciplinary intervention based on a biopsychosocial model including elements of psychology, medicine and physiotherapy (PSYMEPHY). The variables examined were marital status, number of comorbid physical illnesses, years since the onset of pain and anxiety level. The results of this study reveal that perceived anxiety increases the likelihood of a negative impact of fibromyalgia on the quality of life of patients, while being married affect it positively. In addition, the authors stress the importance of an early interdisciplinary intervention to improve health related quality of life, given that the more recent the onset of symptoms, the more effective the educational program.

To better understand the impact of non-pharmacological interventions on sub-categories of fibromyalgic patients, the Castel research group (74) conducted a study on patients with fibromyalgia with low educational levels to a multidisciplinary treatment. The results showed significant improvements compared to the control group in most affected areas, such as sleep quality, psychological stress and catastrophising. Results were relatively well maintained over time, after 12 months. In an analysis of specific factors, Kim *et al.* (75) studied the association between baseline body mass index (BMI) and the post-treatment results after an interdisciplinary intervention in fibromyalgia education (FTP), a set of medical education, psychoeducation, sleep hygiene and cognitive behavioural techniques. This study found no differences between the groups and concluded that an intervention based on psychoeducation is effective and produces

improvements whatever the BMI of participants. Exceptions were physical functioning and role-emotional components which showed smaller improvements with increasing obesity. These findings suggests that, to be effective, a psychoeducational intervention must consider patient recruitment as an important step. Results have shown that certain participant characteristics lead to a better outcomes of the educational programs.

Discussion

The available research for the last decade shows substantial interest about interventions for fibromyalgia broadly concerned with providing information on the disease and on psychoeducation for patients. These interventions combine aspects of various disciplines and follow a biopsychosocial orientation, aimed at improving pain management and intensity of and relief from the psychological symptoms often associated with chronic conditions including fibromyalgia. In the studies reviewed, statistically significant positive results were a feature of almost all studies that compared psychoeducation in relation to a control group.

Specifically, improvements in functional status (55, 57), management of emotions related to illness and pain (56, 58) and an in anxiety and depressive symptoms (60), were noted. When compared to alternate interventions, psychoeducation was shown to improve various outcomes, notably, pain management and intensity, health-related quality of life and tender point number (69, 64). Online educational programs were effective in increasing patient's knowledge of the disease (70), in improving anxiety symptoms and in management of disease-related pain (71). Finally, patients that are younger, married, with higher baseline depression scores and lower tender point count show greater benefits from educational intervention (72, 73).

Obviously, some limits are present in this review: our choice of only one scientific database (PubMed) and inclusion criteria that restricted articles to those written in English or Italian might have excluded important evidence.

Conclusion

Looking to the future, research in the field of education for fibromyalgia syndrome should emphasise enrollment of participants based on recent diagnostic criteria to maximise the validity and reliability of the findings. An additional point is for greater consideration of gender differences (since participants are predominantly women).

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