

# Chronic nonmalignant pain: a challenge for patients and clinicians

Luca Scascighini\* and Haiko Sprott

## SUMMARY

Chronic pain is widely regarded as a condition that is triggered by various factors, including physical, socio-cultural and psychological deficiencies (that is, maladaptive beliefs). These factors are important in the development and maintenance of this unpleasant experience, which consequently requires a biopsychosocial treatment approach. Pain is a multifaceted sense, the perception of which is personal. Pain also depends on various circumstances, and therefore represents a challenge for the patient, as well for the treating physicians. Patients who suffer from long-lasting pain with a predominantly psychosocial component should be referred to specialized pain clinics for further diagnostic assessment and possible allocation to multidisciplinary pain programs. High-quality randomized controlled trials indicate that multidisciplinary pain programs represent the best therapeutic option for the management of patients with complaints associated with complex chronic pain. The prevalence and the costs—both direct and indirect—that are attributed to chronic pain are increasing; however, not enough is being done to sufficiently and effectively treat chronic pain. There is, therefore, a need for well-designed, interdisciplinary, internationally comparable, and widely distributed pain programs, both in outpatient and inpatient settings, to contribute to the prevention of some future pain diseases.

**KEYWORDS** back pain, chronic pain, fibromyalgia, multidisciplinary treatment, review

## REVIEW CRITERIA

Publications from between 1997 and 2007 were retrieved by comprehensive, computer-aided searches of the PubMed, CINAHL and EMBASE databases. A specific search strategy was developed for each database by combining MeSH keywords and other relevant terms including: “multidisciplinary”, “interdisciplinary”, “patient care team”, “back pain”, “fibromyalgia”, “psychosocial”, “prognostic factor”, and “chronic pain syndrome”. A secondary search strategy was performed by screening the references of the identified studies. All articles were full-text papers, with no language restrictions.

*L Scascighini is a Research Associate in the Department of Rheumatology and Institute of Physical Medicine, University Hospital Zürich, Switzerland, and a Lecturer at the Department of Health of the University of Applied Sciences of Southern Switzerland. H Sprott is Senior Attending Physician and Head of Pain Research at the Center of Experimental Rheumatology in the Department of Rheumatology and Institute of Physical Medicine, University Hospital Zürich. He is a Privatdozent of the University of Zürich.*

## Correspondence

\*Department of Rheumatology and Institute of Physical Medicine, University Hospital Zürich, Gloriastrasse 25, CH-8091 Zürich, Switzerland  
luca.scascighini@supsi.ch

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## INTRODUCTION

Medical and neurobiological advances have increased our understanding of the underlying mechanisms of chronic pain; however, the management and treatment of chronic pain remain a challenge for clinicians as well as for patients. Central changes in pain processing have been reported during the development of chronic pain.<sup>1</sup> These changes include hyperalgesia, allodynia, abnormal temporal summation of secondary pain (wind-up), neuroendocrine abnormalities, and abnormal activation of pain-related regions of the brain.<sup>2</sup> Psychosocial factors, such as premorbid depressive attributional style, emotional distress, unemployment or fear-avoidance behavior, are widely recognized to be associated with the development of chronic pain conditions.<sup>3</sup> The International Association for the Study of Pain has defined pain as ‘...an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.’<sup>4</sup> This definition underscores the multidimensionality of pain and endorses the point of view that individual perception and the cognitive interpretation of pain are undoubtedly important in persistent pain conditions.

The traditional biomedical model, which solely focuses on structural or biomechanical abnormalities, has been increasingly replaced with the biopsychosocial model of pain and disability, which emphasizes the role of psychological and social factors in the development and maintenance of symptoms. This approach allows a better understanding of the different factors that influence pain,<sup>5</sup> and comprehensive pain programs are now predominantly based on the biopsychosocial model.<sup>6</sup> Since the introduction of this model, the approach to treatment, as well the understanding, of the chronic pain condition has been revolutionized.<sup>7</sup> Pain and disability should not be merely interpreted as symptoms and functional limitations, but also considered as important stressors in a person’s life—stressors that could lead to emotional distress, such as

fear, anxiety, depression, or uncertainty.<sup>8</sup> A fundamental point is to consider “how perception, emotions and cognition interact with the nervous system and its transmission and modulation of pain impulses”.<sup>9</sup>

This Review aims to present an overview for health care pain professionals regarding the inclusion and exclusion criteria for multidisciplinary pain programs (namely, programs that involve more than two professionals of different medical disciplines), and the intervention modalities for chronic nonmalignant pain conditions. The effectiveness of such programs will also be discussed on the basis of high-quality trials published in the last decade.<sup>10–15</sup>

### THE OCCURRENCE OF CHRONIC PAIN

Numerous epidemiologic studies show that chronic pain represents a very common condition in the community and is associated with deleterious effects on health, employment and daily life.<sup>16–18</sup> Chronic pain constitutes a major public health dilemma in terms of direct and indirect costs and health care consumption, as well as with regard to the personal impact on quality of life.<sup>19</sup> Up to 40% of the US adult population is affected by chronic pain, and it is also a devastating and widespread problem in Europe.<sup>19</sup> Certain groups with low socioeconomic status within the population are significantly more affected by chronic pain.<sup>20</sup> Musculoskeletal pain accounts for a large proportion of diagnoses and ranks among the most frequent causes of total chronic disability;<sup>19,21</sup> approximately 80% of all physicians' visits involve some complaint of pain.<sup>22</sup> Chronic pain is reported in 38% of patients in primary care.<sup>23</sup>

### THE CASE FOR A MULTIDISCIPLINARY APPROACH

Numerous treatment options are described in the literature for the treatment of chronic pain conditions. On the whole, the available interventions are divided into pharmacological, nonpharmacological or a combination of both. Specific interventions are also offered—for example, stress management or educational programs. Owing to the complex nature of chronic pain, medical treatment alone or single-professional approaches might not be effective, and multidisciplinary treatment might be needed.<sup>24</sup> Worldwide, many inpatient and outpatient pain management programs aim to treat chronic

pain conditions<sup>8</sup> and there is a great need for multidimensional management strategies, particularly for chronic pain of neuropathic origin.<sup>25</sup> In contrast to most forms of acute, peripheral, or nociceptive pain,<sup>26</sup> treatment options available to patients who suffer from chronic pain frequently offer only short-term or partial relief from symptoms.

Unfortunately, interdisciplinary pain management is usually introduced at a very late stage in treatment, and often as the last choice, when all other interventions have failed.<sup>27</sup> The majority of these interdisciplinary interventions aim at functional restoration, but also teach cognitive-behavioral aspects to improve pain management from the patient's perspective. A systematic review on chronic back pain has provided evidence that intensive multidisciplinary biopsychosocial rehabilitation with a functional restoration approach might improve pain as well as function.<sup>28</sup>

In the US, medical expenses, lost income, and lost productivity associated with chronic pain total costs of over \$100 billion annually.<sup>29,30</sup> It has been argued that the moderate long-term effect and the lack of an analysis of the cost-effectiveness of multidisciplinary programs could represent a dissipation of available resources. However, robust economic evaluation studies are lacking, and to date no alternative interventions to multidisciplinary chronic pain programs are supported by the literature.

### ASSESSMENT OF CHRONIC NONMALIGNANT PAIN

Before a diagnosis of chronic nonmalignant pain can be made, serious pathologies need to be ruled out. In the majority of cases, clinicians must rely on a clinical evaluation to establish the diagnosis. The establishment of a secure, trustworthy patient–physician relationship is an integral component of the therapeutic intervention and a prerequisite for successful treatment. The American Pain Society recommended replacing the term ‘chronic’ with ‘persistent’ when referring to long-standing pain. A number of clinical parameters should be assessed during the course of the intervention to determine the effect of any treatment or to control the patient's state of health. By doing so, the clinician and the patient have some parameters with which to monitor the development of the disease and, consequently, to promptly react to positive or negative changes by modifying treatment goals,

**Box 1** Recommended indications for multidisciplinary pain programs.

At least three of the following criteria should be fulfilled.

- Persisting pain syndrome, painful experience lasting longer than the healing time (>3 months; chronic phase)
- With/without peripheral trigger (input)
- Psychosocial distress situations associated with, or triggering, the pain condition
- Yellow flags (maladaptive beliefs, lack of coping strategies, helplessness, fear avoidance, dysfunctional pain behavior)
- Cardiovascular deconditioning, chronic fatigue syndrome
- Failure of previous monodisciplinary interventions
- Signs and symptoms of central sensitization (widespread pain, no organic correlate)
- Age 18–65 years
- Satisfactory level of motivation and readiness to change the pain behavior, assessed at preadmission interview performed by a trained clinical psychologist

or adding or suspending interventions. The assessment of psychosocial contributing factors (yellow flags) and comorbidities is helpful for prioritizing optimal treatment strategies—for example, some approaches are more focused on social issues (work, financial subventions), others on physical issues (movement habits, self-efficacy, activity pacing), whereas yet others deal with psychosocial issues (fear-avoidance, self-esteem, stress and communication management). Last, but not least, assessing these factors avoids excessive treatment.

## MULTIDISCIPLINARY TREATMENT APPROACHES

### Indications and exclusion criteria

An appropriate medical indication for multidisciplinary treatment is recognized to be the key to success. Ideally, all disciplines involved in the treatment should assess the patient before entry to the program. In this way, the different professional perspectives are considered and each discipline can determine the patient's rehabilitation potential. A consensus meeting should follow the assessments before deciding if the patient qualifies for the

multidisciplinary program. The main indications for a pain program are indicated in Box 1.

Patients with insufficient language skills are usually excluded from multidisciplinary pain programs, as effective and differentiated communication is required to understand cognitive-behavioral issues. Other exclusion criteria include serious medical pathologies—inflammatory diseases, infection, neoplasia or major psychiatric disturbances, such as severe psychotic episodes or uncontrolled drug abuse. The indications and exclusion criteria for multidisciplinary pain programs reflect recommendations from the current literature.<sup>10–15</sup>

### Prognostic factors

Clinicians who manage patients with chronic nonmalignant pain have recognized that the heterogeneity (e.g. age, cultural and gender differences, and ethnicity) and complexity (e.g. disease severity, etiology, and comorbidity) of this population do not allow every individual to be treated in the same way, without integrating the different needs and expectations. Consequently, to achieve better clinical outcomes, scientifically confirmed criteria for building subgroups that relate to both the diagnosis and the prognosis of chronic pain patients are required. In this way, it would be possible to fit the treatment modalities to the patient, define the main therapeutic focus and optimally allocate the human and financial resources.

Some investigations have been conducted to identify potential indicators of a successful intervention.<sup>31–35</sup> Individual perception and experience with regard to chronic pain predicted the success of treatment better than physical capabilities.<sup>31</sup> A single, blinded prospective cohort study involving patients with chronic musculoskeletal low back pain ( $n=176$ ) or neck pain ( $n=136$ ), reported by Michaelson *et al.*, investigated the value of some factors that predicted a successful response to a multimodal pain program.<sup>32</sup> The main predictors were a low level of perceived pain intensity and distress, low sociability score (high scores represent a need for social activities and dependence on external relations) and optimistic attitudes on the interference of pain with activities of daily living and work.<sup>32</sup>

Other investigators hypothesized a gender difference in the outcome of multidisciplinary pain treatment.<sup>33,34</sup> Edwards *et al.* concluded that women with higher pain tolerance at

program entry exhibited better outcomes.<sup>33</sup> This result was confirmed by Keogh *et al.*, whose results indicate that gender is important in the reports of pain and psychological distress after an interdisciplinary pain management program.<sup>34</sup> General emotional distress has been shown to best predict work status after multidisciplinary intervention.<sup>35</sup> Work status is defined in terms of the rate of return to work (full or part-time) 6 months after treatment. The authors of this study declared that a longer follow-up time would have provided better longitudinal data.

### COMPONENTS OF MULTIDISCIPLINARY PAIN PROGRAMS

Chronic pain encompasses a wide range of symptoms, from disabling pain disorders to suicidal thoughts.<sup>36</sup> Furthermore, chronic pain is described as a “multifactorial condition involving many body systems”.<sup>37</sup> A multidisciplinary approach is, therefore, essential to assess, evaluate and optimally treat patients. Such programs are usually conducted in a group format, but also individually, and involve physicians, physiotherapists, occupational therapists, social workers and clinically trained psychologists. Nurse practitioners are also often on the management team in US pain clinics as well as those in Europe.

The main treatment aims are as follows: to improve health-related quality of life despite the existence of persisting pain symptoms; to enhance the daily functioning of patients and their participation in normal life activities; and to teach the patients how to cope better with pain and to accept pain in some situations. Moreover, the purposes are to reduce pain-associated disorders—in particular, kinesiophobic disturbances (movement-related fear), activity intolerance, cardiovascular deconditioning and physical disabilities. Realistic, reachable goals that focus on activities, coping strategies and health-related quality of life should be discussed with the patient before any intervention.

Several different components are usually included in a modern pain management program.<sup>10–15</sup> During the course of treatment, patients receive dynamically adapted and individually tailored interventions, depending on the actual primary complaint(s) and main therapeutic emphasis. For example, for patients who present mainly with psychosocial distress, the focus could be on aspects such as emotion regulation, stress management, social care intervention, communicative skills and relaxation exercises.

### Patient education

An essential task of the treatment team is to explain the distinction between an acute, adaptive pain in response to injury, and chronic, maladaptive pain.<sup>38</sup> All members of the team should endorse the fact that chronic pain is something real, but that it differs from the adaptive, protective acute pain. Patient education classes are usually conducted in a group format. Moseley *et al.* demonstrated that intensive neurophysiology education in patients with chronic low back pain had an important influence on pain cognition and physical performance ( $P < 0.05$ ), although this intervention was not helpful in changing the perceived disability ( $P = 0.31$ ).<sup>39</sup>

### Cognitive-behavioral elements

Cognitive-behavioral treatment entails a variety of intervention strategies, which vary widely across multidisciplinary pain programs. Essentially, this treatment aims to modify cognitive influences and associations on the experience of pain, reinforce positive beliefs and behaviors, and teach coping strategies. Pain-related acceptance has been shown to be more important in some patients than any coping strategy (which is defined in terms of the use of cognitive and behavioral techniques and self-management to manage demands), and this acceptance leads to enhanced life functioning in patients suffering from chronic pain.<sup>40</sup> Moreover, it seems to be a starting point for modifying pain behavior. Catastrophizing behavior<sup>41</sup> and coping strategies<sup>42</sup> should be addressed as integral parts of the cognitive-behavioral treatment. The expectations of the patients, with regard to possible consequences of pain and the ability to control it, are important in pain management programs.

Another important issue is the impact of fear-avoidance behavior on patients with chronic pain. Fear avoidance involves a catastrophizing behavior, an exaggerated fear of pain, as well as an avoidance of activities, which results in activity intolerance or physical deconditioning. This type of maladaptive behavior may lead to a downward spiral of inactivity and consequently negatively affect health-related quality of life.<sup>43</sup> Clinical observations indicate that some patients show ‘boom–bust’ behavior, which is characterized by periods of overactivity and underactivity, and might lead to an increase in pain intensity.<sup>44</sup> Part of the cognitive-behavioral approach is the application of relaxation exercises, which are aimed at controlling muscle tension, and could be applied to such patients.

### Management of flare-ups/exacerbations

Patient skills concerning self-management strategies and self-efficacy in case of pain exacerbations should be broached in the treatment course. Specific instruction and management strategies—for example, performing relaxing exercises more frequently, self-disclosure, avoiding negative thoughts—should be discussed with the patient and should be introduced in the multidisciplinary pain program to enable the patient to manage and control the pain situation. People with chronic pain should be aware of their own pain-activating or aggravating factors.

### Graduated activity exposure and activity pacing strategy

The patient should be advised to avoid periods of prolonged rest and inactivity, and should be encouraged to stay active and maintain their level of activity. Activity pacing aims to enhance activity tolerance and decrease fear related to movement.<sup>45</sup>

### Optimal drug management

The goal is to obtain the most effective pain relief without major adverse effects.<sup>46</sup> For further information regarding novel pharmacological strategies, as well the theoretical rationale for their use, readers are advised to consult Wood *et al.*<sup>47</sup> The risks and benefits of any pharmacological approach should be discussed with the patient.

### EVALUATION OF PATIENTS

In the evaluation before treatment and in the follow-up period, the minimum of primary outcomes to assess should include several parameters: pain interference in daily living activities, work status, pain-related acceptance, coping strategies, improvements in activities of daily living (ADL)-oriented functionality, overall patient satisfaction and, last but not least, the effect on health-related quality of life. Pain-related acceptance is increasingly recognized as an important issue in the assessment and treatment of patients with chronic pain. A validated psychometric approach—the Chronic Pain Acceptance Questionnaire—which is intended to measure this psychological construct has been proposed.<sup>48</sup> The findings of a study by McCracken *et al.*, which involved 230 patients seeking assessment from a pain management service, suggest that the acceptance variables—specifically, the degree to which one person is engaged in life activities

regardless of the pain and the willingness to experience pain—were reliably stronger predictors of distress and disability compared with coping variables.<sup>49</sup>

Previous research has also shown that positive changes in pain catastrophizing, fear avoidance, coping strategies and depression are related to significant improvements with regard to quality of life and pain behavior. In the following section, these relationships are described in more detail using results from high-quality trials. The quality of the trials has been determined using A CheckList to Evaluate A Report of a NonPharmacological Trial (CLEAR NPT).<sup>50</sup>

### Effectiveness of multidisciplinary, comprehensive pain programs

The effectiveness of an outpatient program based on self-management for patients with fibromyalgia was determined in the study by Cedraschi *et al.*<sup>10</sup> Quality of life and satisfaction with the treatment improved in the post-intervention phase, and the improvement was sustained for 6 months. By contrast, no changes for the intensity of pain were noted. Jensen *et al.* conducted a randomized controlled trial to evaluate the effectiveness of a multimodal cognitive-behavioral treatment designed for ‘learned helplessness’ women (‘learned helplessness’ being based on the score of the Rheumatology Attitudes Index) diagnosed with chronic spinal pain ( $n = 54$ ). The study compared a regular treatment and an experimental treatment that consisted of a 6-week, full-time, multidisciplinary program.<sup>11</sup> After 18 months, self-reported disability and depression statistically significantly improved in the experimental group, but no differences between the groups in well-being and sick leave were reported. In addition, the results proved that it is possible to alter dysfunctional pain coping strategies.

A study by Kole-Snijders *et al.* that included moderately to severely disabled patients with chronic low back pain ( $n = 148$ ) examined the supplemental value of teaching coping strategy skills in addition to an operant-behavioral treatment, which is aimed at promoting healthy behavior, avoiding pain behavior and encouraging activity despite pain.<sup>13</sup> Spinhoven *et al.* analyzed 12 months’ worth of data from this study, which indicated an incontestable change in the pain cognition of participants. Catastrophizing with regard to consequences of pain as well as external pain control decreased

significantly, whereas positive expectation about self-control of pain increased.<sup>15</sup> Pain coping did not improve following treatment; however, the authors emphasize the fact that the application of coping skills requires intensive practice, particularly in the learning phase. An effect on cognitive restructuring in patients with chronic pain could be demonstrated.

Another paper by Jensen *et al.* reported the results of a controlled study in which participants were randomly assigned to one of four treatment conditions: behavior-oriented physiotherapy, cognitive-behavioral therapy, a full-time behavioral medicine rehabilitation program including physiotherapy and cognitive behavioral therapy, or a control group (treatment as usual).<sup>51</sup> A 12-month follow-up and a 3-year follow-up consistently indicated the superior effects of the full-time behavioral medicine program. Women seem to profit more with regard to health-related improvement and return to work compared with men.<sup>52</sup> Lemstra *et al.* compared the efficacy of a treatment-as-usual control group versus a 6-week intervention group including a rheumatologist, physiotherapist, exercise in group format, patient education, dietary lecture, and massage sessions for patients with fibromyalgia ( $n = 79$ ).<sup>14</sup> Subjects in the intervention group showed a significant improvement in the primary outcome variable 'self-perceived health status'. The average pain intensity, pain-associated disabilities, depression scores, days and hours in pain were decreased in comparison with the controls. The follow-up analysis at 15 months revealed that the effects in the intervention group were still significant. Additionally, the amount of medication could be lowered with a statistically significant difference. Work status was not enhanced after intervention or in the follow-up period.

A randomized controlled trial with a follow-up of 24 months was designed to investigate the effect of a multidisciplinary treatment in women ( $n = 120$ ) with nonspecific chronic low back pain.<sup>12</sup> The participants were randomly divided into two intervention arms, one with a multidisciplinary approach conducted in groups, the other based on individual physiotherapy. The 70-hour multidisciplinary program comprised physical training, workplace intervention, back school, relaxation training and cognitive-behavioral stress management methods ( $n = 59$ ). The individual physiotherapy ( $n = 61$ ) was administered for ten 1-hour treatment sessions. Surprisingly,

no incremental benefits were demonstrated in the multidisciplinary group compared with the individual physiotherapy, which was carried out with a cognitive-behavioral approach.

In summary, these high-quality studies report encouraging evidence that supports the efficacy of a multidisciplinary approach in the treatment of complex, chronic pain conditions. Other reports also demonstrate that a multidisciplinary, cognitive-behavioral approach might be superior to single modalities.<sup>53</sup> Issues about how to determine the success of a multidisciplinary program have been raised in the last decade. Health care use could potentially be used to determine success. Primary endpoints should be defined in terms of health-related quality of life, acceptance of pain and coping strategies. A patient could be described as being successfully treated if they have succeeded in learning to cope with pain and to change their perspective with regard to chronic pain.

## CONCLUSIONS

The treatment of chronic nonmalignant pain represents an important challenge for health care professionals, as well as for the patient and their social net. An understanding of the various factors that lead to persistent pain is essential for recognizing the complexity of this disease. To improve the treatment of chronic pain, a multidisciplinary approach permits intervention using different therapeutic focuses to be addressed. The identification of stronger prognostic factors might be helpful in addressing the potential effectiveness of multidisciplinary interventions at an early stage of the disease. Secondary gain aspects with regard to chronic musculoskeletal pain (such as escape from family responsibilities or seeking financial compensation) or even the intensity of pain could not be dealt with in this Review, but are effectively discussed in Dersch *et al.*<sup>54</sup> Another important issue is the need for more research in the area of chronic pain, and also for undergraduate, postgraduate and continuing education studies in pain management.<sup>55</sup>

A review of cost-effectiveness was not the purpose of this article, given that reports addressing this question are scarce and methodologically of low quality. In the future, however, we expect that those who provide health care and health insurance will require from patient-oriented research more data about the cost-effectiveness of multidisciplinary programs. Benchmarking should be progressively

introduced with the intention of improving the level of competition between the different pain programs and, therefore, the quality of the care. In our opinion, cooperation between more pain clinics might dramatically optimize the management of patients with chronic pain in terms of bringing together skills, experience and encouraging mutual professional exchange. Moreover, multicenter, international studies with an adequate sample size could be more easily performed in such situations, contributing to an enhanced body of knowledge in favor of patients and clinicians. Hopefully, this idealistic picture will be our future clinical perspective.

**KEY POINTS**

- A multidisciplinary approach to treating pain represents a valid, evidence-based treatment modality for patients with chronic pain
- Multidisciplinary pain programs should ideally involve a physician, a physiotherapist, a psychologist, an occupational therapist and a social worker to cover the main areas of treatment of chronic pain based on the biopsychosocial model of illness
- The primary aims of pain programs are to improve the health-related quality of life and to teach the patient how to accept and cope with pain
- Pre-existing psychological vulnerabilities and high psychosocial distress should be considered in the comprehensive assessment of patients with chronic pain before embarking on a pain management program

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**Competing interests**

The authors declared no competing interests.