Outcomes of a Comprehensive Pain Rehabilitation Program for Patients With Fibromyalgia

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Abstract

Objective: To analyze opioid intake interference with psychological, well-being, and functional outcomes and medication tapering in patients with fibromyalgia admitted to the Mayo Clinic Pain Rehabilitation Program (MCPRP) in Florida.

Patients and Methods: A retrospective study on MCPRP outcomes was conducted. We reviewed the health records of 150 patients with fibromyalgia who participated in the program from May 1, 2014, to May 1, 2015. All patients were asked to fill out a survey at admission to and dismissal from the program. Surveys contained questions from the numeric pain score, Multidimensional Pain Inventory (perceived life control and interference of pain subscales), Center for Epidemiological Studies—Depression Scale, Pain Catastrophizing Scale, 36-Item Short-Form Health Status Survey (general health perceptions subscale), and Pain Self-Efficacy Questionnaire. A medical record review identified categories and number of medications at program admission and dismissal. Patients were divided in 2 groups: those whose concomitant medication did not include opioids at admission (no opioids group) and those whose concomitant medication included opioids at admission (opioids group).

Results: By dismissal from the MCPRP, patients with fibromyalgia in the no opioids group had a significant (P < .05) improvement in all the self-reported scores. Medication, including opioids, were effectively tapered at a substantially higher percentage in the opioids group.

Conclusion: Benefit of the comprehensive pain rehabilitation program in patients with fibromyalgia was indicated by clinical improvements in pain severity, physical and emotional health, and functional capacity while successfully tapering medication. Opioid intake at admission may modify the program outcomes.

Fibromyalgia (FM) is a complex pain disorder that can be challenging to diagnose, in part because the pathophysiologic underpinnings have yet to be fully understood. Prevalence is at 2% in the United States, similar to that of the world’s population. Late diagnosis is associated with a large number of medication prescriptions that are often ineffective (or potentially counterproductive) to patient care, specifically, opioids and benzodiazepines. Nonsteroidal anti-inflammatory drugs (NSAIDs) and additional over-the-counter self-medication and supplements are eventually used with limited efficacy. Mayo Clinic offers a 3-week outpatient Mayo Clinic Comprehensive Pain Rehabilitation Program (MCPRP) that provides cognitive-behavioral interdisciplinary intervention to patients with multiple chronic pain conditions, including FM. The MCPRP utilizes self-report validated questionnaires as diagnostic tools for chronic pain syndrome, provides physical and occupational therapy, and medical and psychological support with active medication tapering. Of note, evidence-based effectiveness of pain rehabilitation addresses physical, psychological, and cognitive outcomes along with medication tapering.
BACKGROUND
The prevalence of FM is 0.5% to 5% in the general population, depending on the diagnostic/classification criteria used and the population analyzed. Fibromyalgia is substantially debilitating, characterized by widespread musculoskeletal pain, fatigue, sleep disturbance, cognitive difficulties, and centrally mediated pain amplification, frequently overlapping with central sensitization syndrome (CSS). It occurs in both sexes and all ages, although it was previously thought to occur most commonly in middle-aged women (58.7% of cases). Patients report generalized chronic pain for at least 3 months with cognitive deficits that may include memory and attention issues. The wide variety of symptoms and associated comorbidities often lead to a complex and delayed diagnosis. Patients with FM have a high rate of disability, with more than 70% of patients self-reporting work disability compared to 19% in the general population.

Over the years, the condition has been called various terms such as neurasthenia and fibromyalgia in the 1930s, until it was finally named fibromyalgia in 1990 by the consensus criteria established by American College of Rheumatology (ACR) preliminary criteria, revised in 2010 and modified in 2011 and 2016. The American College of Rheumatology 2010 diagnostic criteria eliminated the tender point examination and recommend use a symptom-based diagnostic assessment through the Widespread Pain Index (WPI) and the Symptom Severity Scale (SS). Symptomatology is characterized by allodynia and hyperalgesia, and the precise underlying pathophysiologic condition is not entirely elucidated. It is commonly associated with concomitant small fiber neuropathy (40% to 50%) and linked to hyperexcitability of the nociceptive system that ultimately results in central amplification known as CSS, characterized by a disrupted somatosensory signal processing. Interestingly, endogenous opioidergic activity is increased in FM with consequent opioid receptor down-regulation, which partially explains why opioid therapy is ineffective.

Fibromyalgia is associated with fatigue, poor sleep, cognitive deficits, headaches, anxiety, and depression with a wide range of somatic symptoms. These comorbidities are frequently found in conditions such as chronic fatigue syndrome, irritable bowel syndrome, and a new spectrum of unexplained conditions that would eventually reflect underlying CSS. In a chronic pain population, 2% to 40% (mean, 15%) of patients develop CSS, particularly in FM patients with related psychopathologic conditions, which have been termed functional syndromes, medically unexplained symptoms, and bodily distress syndrome. Central sensitization syndrome is a neurophysiologic condition that increases neuroexcitability of dorsal horn neurons by increased synaptic transmission and reduces inhibition, in which specific brain areas, the periaqueductal gray matter and the rostral ventromedial medulla, play a critical role. Functional, structural, and chemical changes in the central nervous system eventually modify the sensory, emotional, and modulatory circuits that normally inhibit pain, which underlies increased pain sensitivity associated with hyperalgesia and/or allodynia.

Polypharmacy is common in the chronic pain population as a consequence of these patients’ chronic condition and frequent comorbidities. Patients are prescribed several medications and take numerous over-the-counter drugs and supplements. This practice is not only inappropriate but also increases the risk of drug abuse, interactions, adverse events, and risk of hospitalization. Pharmaceuticals prescribed for FM include a heterogeneous group of medications perhaps best collectively termed neuromodulatory medications. Currently, there are 3 US Food and Drug Administration—approved medications for FM: pregabalin (gabapentinoid, voltage-gated calcium channel subunit ligand), duloxetine (selective serotonin and norepinephrine reuptake inhibitors), and milnacipran (serotonin-norepinephrine reuptake inhibitor). Tricyclic antidepressants and muscle relaxants are often prescribed, although not specifically approved by the US Food and Drug Administration for FM. Gabapentinoids have been found to improve pain, quality of sleep, and fatigue, and tricyclic antidepressants can improve pain, sleep, and bowel and bladder symptoms.
Serotonin-norepinephrine reuptake inhibitors can help with fatigue.\textsuperscript{35} A recent study on the pharmacological patterns of medication use in FM found that frequently prescribed drugs were tramadol (40%) and benzodiazepines (30%) and, to a lesser extent, duloxetine (22%), pregabalin (19%), amitriptyline (17%), NSAIDs (16%); with 7.5% of participants under opioids prescription.\textsuperscript{36} Additionally, it was shown that tapering off higher doses of opioids requires longer period of time, that the duration of opioid use does not affect the length of tapering efforts, and that effectiveness of tapering without adjuvants is successful when combined with cognitive behavioral strategies used in pain rehabilitation programs.\textsuperscript{37} Nonpharmacologic strategies based in a cognitive behavioral approach eventually contribute to better outcomes,\textsuperscript{37,38} with a positive effect on pain, mood, self-efficacy reducing the number of physician visits, medications taken,\textsuperscript{39} and higher rate of return to work.\textsuperscript{40}

To access psychological, well-being, and functioning self-reported outcomes as well as the effectiveness of medication tapering at completion of our rehabilitation program, we reviewed 150 cases of FM seen in our practice in one year period (2014 to 2015), to compare outcomes of patients admitted with or without daily opioid intake.

**PATIENTS AND METHODS**

This study was approved by the Mayo Clinic Institutional Review Board (IRB No. 14-002517).

**Study Participants**

The retrospective study collected data from patients with FM who completed the 3-week MCPRP from May 1, 2014, to May 1, 2015, in Florida. All patients 18 years old or older with a prior diagnosis of FM, clear impairment in daily functioning, deconditioning, and an interest/acceptance of the need for pain rehabilitation were included in the program. Additionally, patients were excluded when the minimal criteria from the WPI and SS scales were not met. Participants were divided in 2 groups: patients who were admitted to the program with no daily opioid intake (NO) and patients who were admitted with any daily dosage of opioids (OP).

**Treatment**

The MCPRP is a 3-week treatment regimen for patients with intractable FM when other standard-of-care options have been exhausted.\textsuperscript{4,41} The MCPRP has an emphasis on physical reconditioning, occupational therapy, cognitive-behavioral interventions, and medication weaning and management that takes place over more than 100 hours. Physical therapy aims to utilize moderate physical reconditioning to improve activity tolerance despite symptoms. Occupational therapy provides tools to teach and apply the concepts of moderation, time management, and appropriate activity modification. Cognitive-behavioral therapy group sessions, led by a pain psychologist, address the behavioral, cognitive, and emotional comorbidities of chronic pain. Physicians, physician assistants, and nurses provide medical oversight for medication tapering of all symptom-targeted pharmacological treatments.

**Study Measurements**

**Concomitant Medications.** On enrollment in the MCPRP, patients provide a detailed list of their current medications. All opioid medications and most medications are actively tapered during the program, regardless of patient motivation to do so (excluding anticonvulsants and antidepressants used as neuromodulators of chronic pain) as a standard practice of the MCPRP.

**Pain Scores and Self-Reported Questionnaires.** Patients in the MCPRP were asked to answer computer-based surveys recorded using the Research Electronic Data Capture (REDCap) system, version 7.4.23,\textsuperscript{42} hosted on the institutional internal server. REDCap surveys used in this study included the Numeric Pain Rating Scale,\textsuperscript{43} Multidimensional Pain Inventory (MPI),\textsuperscript{44} 36-Item Short-Form Health Status Survey (SF-36),\textsuperscript{45} Center for Epidemiological Studies—Depression Scale (CESD),\textsuperscript{46} Pain Catastrophizing Scale (PCS),\textsuperscript{47} and Pain Self-Efficacy Questionnaire.
(PSEQ), and the system also gathered patient demographic information.

**Statistical Analyses**

Mean scores difference was analyzed using paired 2-sided t tests to evaluate questionnaire outcomes and pain scores. Categorical variables were compared using 2-sided \( \chi^2 \) tests and \( t \) tests to compare means. All group comparisons were performed using an analysis of variance followed by the Tukey test. Frequency distribution analysis was used to evaluate demographic characteristics and medications. All statistical analyses were performed using GraphPad Prism, version 9.0.0. The results were considered statistically significant at \( P < .05 \); we used 95% CIs.

**RESULTS**

Among the 256 patients who completed the MCPRP from May 1, 2014, to May 1, 2015, 195 satisfied inclusion criteria (WPI and SS scales), 45 of whom were excluded because of no FM diagnosis. Baseline demographic characteristics of the 150 included participants are presented in Table 1. Most of the patients were women (70.1% to 75.3%), married (71.2% to 72.7%), unemployed (79.5% to 81.8%), and White (79.5% to 94.8%) and had an average of 11 years of chronic pain. The number of patients observed in both groups was similar: 73 of 150 patients (48.7%) in the NO group and 77 (51.3%). The OP group had significantly more White patients (73 of 77 [94.8%]) and fewer African American patients (2 of 77 [2.6%]) than the NO group (58 of 73 [79.5%] White and 12 of 73 [16.4%] African American; \( P = .02 \)). This observation may reflect nationally published data showing that women and Whites are more prone to opioid addiction.

The average numeric pain score on admission was 6.40 in the NO group and 6.52 in the OP group, and these scores were reduced to 4.67 and 5.10, respectively, at dismissal (\( P < .0001 \)), which represents 27.0% improvement in the NO group and 21.8% in the OP group (Table 2). At dismissal, all questionnaire outcomes significantly improved in both groups (all \( P \leq .0008 \)). Significant improvements were found in MPI scores (\( P < .0001 \) for both NO and OP groups) for perceived control (NO, 24.2%; OP, 21.1%) and interference of pain (NO, 12.7%; OP, 8.2%).

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**TABLE 1. Demographic Characteristics of the Study Population**

| Variable               | No opioids group (N=73) | Opioid group (N=77) | \( P \) value |
|------------------------|-------------------------|---------------------|---------------|
| Sex                    |                         |                     | .47           |
| Male                   | 18 (24.7)               | 23 (29.9)           |               |
| Female                 | 55 (75.3)               | 54 (70.1)           |               |
| Age (y)                | 50.7±14.1               | 49.7±13.7           | .56           |
| Marital status         |                         |                     | .37           |
| Married                | 52 (71.2)               | 56 (72.7)           |               |
| Single                 | 12 (16.4)               | 10 (13.0)           |               |
| Divorced               | 0 (0.0)                 | 3 (3.9)             |               |
| Separated              | 6 (8.2)                 | 7 (9.1)             |               |
| Employment status      |                         |                     | .71           |
| Employed               | 15 (20.5)               | 14 (18.2)           |               |
| Unemployed             | 58 (79.5)               | 63 (81.8)           |               |
| Race                   |                         |                     | .02           |
| White                  | 58 (79.5)               | 73 (94.8)           |               |
| African American       | 12 (16.4)               | 2 (2.6)             |               |
| Asian                  | 0 (0.0)                 | 1 (1.3)             |               |
| Other                  | 3 (4.1)                 | 1 (1.3)             |               |
| Average pain duration (y) | 10.8±9.3               | 11.6±10.0           | .53           |

*Data are presented as percentage (%) of participants or average ± SD.

*Unknown marital status: 3 in no opioid group; 1 in opioid group.
We observed that the OP group took a larger number of medications both at admission and dismissal compared to the NO group (P < .0001). Improvement of 26.8% (NO) and 28.4% (OP) in SF-36 and PSEQ in functioning and health perception (P < .0001) may reflect health perception, functioning, and socializing. Particularly for PSEQ, improvement reached 72.8% in the NO group compared to 43.9% in the OP group, indicating a tendency for better outcome in the NO group (P = .08). Improvements in scores for the PCS (NO, 35.3%; OP, 27.6%) and CESD (NO, 42.6%; OP, 34.1%) indicate substantial decreases in depressive symptoms and negative pain-related cognitions. Overall, the results highlight the effectiveness of the MCPRP to improve pain perception, functioning, and well-being and raises the question of whether the tendency for better outcomes in NO patients may be related to negative-effect polypharmacy. We observed that the OP group took a larger number of medications both at admission and dismissal compared to the NO group (P < .0001; Table 3).

On admission, 77 of the 150 patients (51.3%) were taking opioid medications, with the average of 60.33 mg oral morphine equivalents (OMEs) per day, ranging between 5 mg and 340 mg OMEs per day. Among the 77 patients in the OP group, opioids were not tapered in 5 (6.5%); however, the dose was reduced by 84%. One patient was excluded from the OME calculation because of the presence of an intrathecal fentanyl delivery system as an outlier for OME calculation. By the end of the program, this patient’s intrathecal fentanyl dose was weaned to 190 μg/d (OME, 5700 μg/d), which was considered a statistical outlier for OME calculation. The frequency of patients taking various classes of major medications and the medium number of medications taken reveal polypharmacy in our patients (Tables 3 and 4). In both the OP and NO groups, the number of patients taking antidepressants (P < .0001), benzodiazepines (P < .0001), and supplements/vitamins (P < .0004 and P < .0001, respectively), were significantly reduced at dismissal. Additionally, in the OP group, anticonvulsants (P < .0001), NSAIDs (P < .0003), opioids (P < .0001), and muscle relaxants (P < .0001).

**TABLE 2. Self-Reported Scale Scores and Percentage of Improvement**

| Outcome scale                  | Group | Admission score | Discharge score | Score difference | Paired 2-sided t values (df) | P value Improvement |
|-------------------------------|-------|-----------------|-----------------|-----------------|-----------------------------|---------------------|
| NRS                           | NO    | 6.40 ± 1.63     | 4.67 ± 2.33     | −1.73 ± 0.33    | −5.15 ± 1.44                | < .0001             | 27.0                |
|                               | OP    | 5.62 ± 2.16     | 5.01 ± 2.38     | −1.43 ± 0.35    | 3.92 ± 1.52                 | < .0001             | 21.8                |
| **MPI**                       |       |                 |                 |                 |                             |                     |                     |
| Perceived control             | NO    | 46.65 ± 8.44    | 57.92 ± 9.04    | 11.27 ± 1.46    | 7.73 ± 1.44                 | < .0001             | 24.2                |
|                               | OP    | 47.62 ± 8.17    | 57.67 ± 8.52    | 10.09 ± 1.35    | 7.90 ± 1.52                 | < .0001             | 21.1                |
| Interference of pain          | NO    | 53.92 ± 5.72    | 47.06 ± 2.33    | −6.87 ± 1.21    | −5.67 ± 1.44                | < .0001             | 12.7                |
|                               | OP    | 52.02 ± 6.81    | 47.74 ± 8.85    | −4.26 ± 1.36    | 3.42 ± 1.52                 | .0008               | 8.2                 |
| SF-36, general health perception| NO | 34.11 ± 12.25  | 43.25 ± 12.34  | 9.48 ± 2.04     | 4.66 ± 1.43                 | < .0001             | 26.8                |
|                               | OP    | 35.38 ± 11.31   | 45.43 ± 11.50   | 10.08 ± 1.85    | 5.57 ± 1.52                 | < .0001             | 28.4                |
| CESD                          | NO    | 26.01 ± 12.07   | 14.95 ± 11.52   | −11.07 ± 1.97   | 5.63 ± 1.44                 | < .0001             | 42.6                |
|                               | OP    | 25.49 ± 11.81   | 16.81 ± 13.09   | −9.31 ± 1.10    | 4.66 ± 1.52                 | < .0001             | 34.1                |
| PCS                           | NO    | 26.55 ± 10.33   | 17.18 ± 10.38   | −9.37 ± 1.73    | −5.43 ± 1.44                | < .0001             | 35.3                |
|                               | OP    | 25.23 ± 9.98    | 18.27 ± 12.00   | −6.91 ± 1.84    | 3.75 ± 1.52                 | .0003               | 27.6                |
| PSEQ                          | NO    | 26.16 ± 12.61   | 45.21 ± 12.18   | 19.04 ± 2.07    | 9.22 ± 1.44                 | < .0001             | 72.8                |
|                               | OP    | 29.92 ± 12.27   | 43.04 ± 12.50   | 13.78 ± 2.01    | 6.87 ± 1.52                 | < .0001             | 43.9                |

*CESD, Center for Epidemiological Studies—Depression Scale; MPI, Multidimensional Pain Inventory; NO, no opioids on admission; NRS, Numeric Pain Rating Scale; OP, opioids on admission; PCS, Pain Catastrophizing Scale; PSEQ, Pain Self-Efficacy Questionnaire; SF-36, 36-Item Short-Form Health Status Survey.

aData are presented as mean ± SD unless indicated otherwise.
were similarly reduced, suggesting a larger number of medications tapered \((P<.0001)\). In addition, lorazepam milligram equivalents were significantly reduced in the OP group \((P<.0001)\). In the NO group, lorazepam milligram equivalents were not reduced, which is possibly related to less benzodiazepine intake at admission. Specifically, in the OP group, medication reduction occurred in anticonvulsants, antidepressants, muscle relaxants, opioids, NSAIDs, and supplements/vitamins at dismissal compared to the NO group in which reductions were observed in antidepressants, benzodiazepines, and supplements/vitamins only. In addition, the greater the number of total medications on admission (indicating more severe polypharmacy) was associated with better improvement in PSEQ score \((P=.01)\). Patients taking antiemetics on admission had better improvement in CESD \((P=.01)\), MPI-life \((P=.05)\), and PSEQ \((P=.007)\). Patients taking muscle relaxants on admission had better improvement in SF-36 health perception \((P=.02)\). Patients not taking supplements/vitamins on admission had better improvement on MPI-life at dismissal from the MCPRC \((P=.04)\). The Figure illustrates these differences.

**DISCUSSION**

Overall, the results of our study indicated beneficial outcomes after the 3-week MCPRP. The self-reported pain scores improved about 22% in the OP group and 27% for the NO group of patients. At the MCPRP at Mayo Clinic in Rochester, Minnesota, historical outcomes have been reported at 27.8% improvement in pain scores for patients taking opioids daily and 24.6% improvement in pain scores for patients not taking opioids.\(^3\) Our results revealed better improvement in the NO group than in the OP group. Earlier studies found that daily opioid intake may be associated with greater comorbidities and psychiatric and substance abuse disorders and negatively impact self-reported scores.\(^3\) Taper methodology is tailored for each individual patient, independent of opioid dosage, and allows pain-related score improvement regardless of program completion.\(^3\) One of the highlights of the MCPRP is that medication is actively tapered, even in reluctant patients.
accompanied by a remarkable improvement in self-reported scores. Although the total number of medications was substantially reduced in both groups (from 7.33 to 3.85 in the NO group and from 10.7 to 6.4 in the OP group), that reduction is likely related to a higher number of prescribed medications in the OP group. This finding further highlights the negative influences of polypharmacy and opioid intake, and supports a possible need for a specific therapeutic strategy in this group. Although combined drug therapy may be beneficial for patients with chronic pain, evidence of the opposite effect is concerning.

Patients with FM have increased risk for development of depression and anxiety related to opioid prescription. The literature has revealed improvement in depressive symptoms from minor to normal scores. At admission, our patients had worse CESD scores compared with those reported in the literature (NO, 26.01; OP, 25.49). However, dismissal CESD score improvement was remarkable (15.6), indicating a successful program regardless of admission scores.

![FIGURE](image-url)

**FIGURE.** Number of medications taken at admission (first column of each group) and dismissal (second column) in group with no daily (OP) opioids intake compared to group with any dosage of daily opioid intake (OP) on admission. Number of asterisks indicate the level of significance. LME, lorazepam milligram equivalent; OME, oral morphine equivalent.

| TABLE 4. Median Number of Medications Taken* |
|-------------------------------------------|
| Medications                          | Admission | Dismissal | Wilcoxon signed rank test | P value |
|-----------------------------------------|-----------|-----------|---------------------------|---------|
| Total medications                      | 12 (7-19) | 8 (5-12)  | 5623.5                    | <.0001  |
| Antidepressants                        | 2 (1-2)   | 1 (0-1)   | 4830                      | <.0001  |
| Supplements/vitamins                   | 1 (0-3)   | 0 (0-0)   | 4625.5                    | <.0001  |
| Muscle relaxants                       | 0 (1-0)   | 0 (0-0)   | 657                       | .0024   |

*Data are presented as median (interquartile range).
Catastrophizing in patients with chronic pain is linked to higher pain intensity, higher disability, and psychological distress. It is associated with increased activity in several brain areas related to limbic, emotional, motor, and attentional aspects, altering pain perception, attention, and anticipation. In our study, PCS scores decreased (NO, 35.3%; OP, 27.6%), ranging from 17.18 to 18.27, but they remain higher compared with the general population (13.87) and in chronic pain populations (NO, 26.01; OP, 25.49) vs 22.3 reported in the literature. Patients in our NO group tended to have a better score improvement, which may be related to the negative effect of opioids and polypharmacy.

Perception of global health reflects overall perception of health, well-being, and functioning measured by the SF-36. Admission scores in our study were 34.11 in the NO group and 35.38 in the OP group, with a mean score improvement to 9.48 (NO) and 10.28 (OP) by dismissal correlated with clinically positive outcomes. A previously reported SF-36 mean score for FM was 54.4. Our OP group tended to have better improvement in global health perception (28.4%) than our NO group (26.8%). This observation is relevant for patients taking opioids at admission because this group has higher scores of depression and pain catastrophizing.

The average perceived life control in our patient population was lower (47.1) at admission compared with that reported in the literature (49.2). Perceived life control improved 24.2% (NO) and 21.1% (OP), remaining at higher levels compared with other studies. For pain interference, our patients' admission scores were 53.92 (NO) and 52.02 (OP) and decreased to 47.06 (NO) and 47.74 (OP), while improvements reported in the literature were as low as 43. However, there was a significant improvement in our patients, both statistically and clinically.

The PSEQ covers a range of functions, including household chores, socializing, and work as well as coping with pain without medication. Higher self-efficacy is associated with fewer pain behaviors and less physical impairment in patients with FM, with an average score of 25.5. Our results revealed improvements from 26.16 to 45.21 (NO) and 29.92 to 43.04 (OP). Patients in the NO group had a remarkable 72.8% improvement (P<.0001). With exception of SF-36 score, patients in our NO group had greater benefits than the OP group, which may indicate difficulties regarding benefit from the program in patients taking opioids on admission.

Polypharmacy is highly prevalent in FM, contributes to exacerbation of symptoms, and may prompt decreased benefits from the MCPRP. Optimized pharmacological therapy along with physical and emotional aspects are promoted by the MCPRP and proven to be beneficial to patients. The number of medications was effectively tapered, particularly decreasing the number of opioids (91.1%) with a reduction of 96.5% OME, benzodiazepines (NO 86.3%; OP 92.2%), and supplements/vitamins (NO 78.3%; OP 80.6%), while patients concomitantly experienced clinical improvement in multiple domains. To a smaller extent, the number of NSAIDs, muscle relaxants, and triptans were also actively reduced. Particularly in FM, polypharmacy potentially contributes to burdensome adverse effects such as sedation and physical and psychological dependence, and even when documented to be ineffective in relieving pain and improving function, many patients find themselves without a pragmatic option for cessation without symptom exacerbation. Nevertheless, this study adds evidence to the effectiveness of the MCPRP models, and regardless of differences among them, the interdisciplinary, team-based functional restoration delivers remarkable improvement to patients with chronic pain and is also efficient in tapering medications, which further contributes to better outcomes. Our OP group had 7 different medication categories tapered compared with 4 categories tapered in the NO group. This represent an reduction of 40.2% in the OP group and 47.5% in the NO group in total number of medication tapered. In addition, only 7 of 77 (9.1%) OP patients were not weaned off opioids by the end of the program. Taken together, these results confirm the program efficacy, and, particularly in OP patients, more medications were tapered, regardless of a lower psychological and functioning score improvement. This finding may suggest the negative effects...
of opioids and polypharmacy in patients with FM. Cognitive disfunction and psychological status is knowingly influenced by opioid intake.2,67

CONCLUSION
Patients with FM experience clinical improvements in pain severity, physical and emotional health, and functional capacity when treated with a comprehensive pain rehabilitation program improving quality of life and facilitating a return to regular daily activities. Notably, these improvements can occur while patients concomitantly undergo systematic medication tapers, including opioids. Patients who started the MCPRP not taking opioids daily achieved better outcomes by the end of the program suggesting that the group of patients taking opioids at admission may benefit from a group-specific management.

Abbreviations and Acronyms. CESD, Center for Epidemiological Studies—Depression Scale; CSS, central sensitization syndrome; FM, fibromyalgia; MCPRP, Mayo Clinic Comprehensive Pain Rehabilitation Program; MPI, Multidimensional Pain Inventory; NO, no opioids on admission; NSAID, nonsteroidal anti-inflammatory drug; OME, oral morphine equivalent; OP, opioids on admission; PES, Pain Catastrophizing Scale; PSEQ, Pain Self-Efficacy Questionnaire; SF-36, 36-item Short-Form Health Status Survey; SS, Symptom Severity Scale; WPI, Widespread Pain Index

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