

## Specialized Pain Clinics in Primary Care: Common Diagnoses, Referral Patterns and Clinical Outcomes – Novel Pain Management Model

Yacov Fogelman, Eli Carmeli, Amir Minerbi, Baruch Harash, and Simon Vulfsons

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### Abstract

An estimated 19% of the adult population in western countries lives with chronic pain. Pain management lies mainly within the primary care and community setting. We evaluated the outcome of a new model of secondary care clinics, conducted by primary care physicians with specialized training in pain medicine. Data on referral patterns, prevalence of pain diagnosis, and medication consumption were recorded at five secondary pain management clinics in the community setting. In total, 997 patients with pain attended 2,652 visits (average 2.7 visits *per* patient) during 12 mo. Patients' age ranged from 18 to 92 yr (mean  $59 \pm 19$ ). Mean pain intensity on the first visit, evaluated by the visual analogue scale was 7.7/10. Myofascial pain syndrome was the most common diagnosis (82%). Treatment included dry needling or trigger point injection (82%), manual myofascial release (23%), and pharmacotherapy (38%). Significant short-term improvement after treatment was reported by 75% of patients, and 72% reported long-term improvement. Four percent were referred to tertiary care pain clinics, 5% were referred to other specialists, and 5% to imaging. Secondary, community-based pain clinics, run by specially-trained primary physicians, demonstrated feasibility. The vast majority of patients referred to the clinics were treated using simple, inexpensive modalities, while sparing referrals to unnecessary consultation visits, imaging tests, and medications.

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Y. Fogelman (✉), A. Minerbi, B. Harash,  
and S. Vulfsons  
Institute of Pain Medicine, Rambam Health Care Campus,  
Haifa, Israel

The Ruth and Bruce Rappaport Faculty of Medicine,  
Technion – Israel Institute of Technology, 8 Efron Street,  
Haifa, Israel  
e-mail: [yfogelman@gmail.com](mailto:yfogelman@gmail.com)

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E. Carmeli  
Department of Physical Therapy, University of Haifa, 199  
Aba Khoushy Ave., Haifa, Israel

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**1 Introduction**

Chronic pain has been described as a world health problem, and its management is a fundamental human right (Declaration of Montréal 2017; Minerbi and Vulfsons 2013). The prevalence of moderate-severe chronic pain (more than 6 mo) is 19% among adult Europeans (Turk et al. 2016). The long-term effects of chronic pain can be far reaching and include neurobiological and psychosocial consequences. Work productivity, quality of life, self-efficacy, coping, mood, sleep and appetite disorders, depression, fear, and anxiety are all negatively influenced by chronic pain (Mehta et al. 2016; Kroenke 2014; Breivik et al. 2006). Chronic pain also has a detrimental effect on patients' families and caregivers, who often become subject to great physical and psychological burdens in their efforts to be supportive (Dueñas et al. 2016; Carmeli 2014).

Due to a large number of patients and the paucity of tertiary pain care management facilities, pain is undertreated. Waiting lists for pain specialists can be extremely long, severely compromising professional pain consultation (Thomsen et al. 2002). While the care of chronic pain patients remains predominantly in the realm of primary care physicians (PCPs), PCPs with adequate knowledge of managing these patients are in short supply (Declaration of Montréal 2017; Peppin et al. 2015; Lincoln et al. 2013; Leverence et al. 2011). As a result, pain management services in the community lead to suboptimal and fragmented pain care, which has a negative impact on both individual patient care and public health.

The suboptimal management of chronic pain calls for a paradigm change. One proposal for such change (Minerbi and Vulfsons 2013) suggests the development of a pain service based on three levels of care: (1) PCPs; (2) secondary care clinics, operated primarily by PCPs trained in pain management; and (3) pain specialists working in ter-

tiary care centers. According to this model, a school for pain medicine was established in Israel in 2010. The aim was the provision of in-depth year-long training for PCPs in the management of chronic pain. Since initiation of the program, six pain management education courses for PCPs have been completed at the Technion School for Continuing Medical Education. One hundred and thirty nine physicians who completed the first course received a certificate of 'Pain Trustee', testifying to 120 h of theoretical and practical education in pain medicine (50% theory and frontal lectures, 50% hands-on teaching). Fifty-six of these physicians participated in an additional course of 120 h in total (25% theoretical and 75% hands-on clinical teaching), together with a practicum of an additional 60 h. Completion of the two courses and practicum, totaling 300 h, entitled the participants to a diploma in Pain and Musculoskeletal Medicine. Five physicians with this diploma also received practical training at the Rambam Institute for Pain Medicine; a large tertiary center pain clinic based in Haifa, Israel. They dedicate part of their clinical time as family physicians to pain management. As 'secondary pain trustees', they treat their own patients with pain, and patients referred by other PCPs.

The major aim of the present study was to describe the activity in these five secondary pain clinics in terms of diagnoses made, treatments given, measures of clinical outcomes, imaging studies conducted, and further referral. As such, this study examined the feasibility of a model of pain management run by specialized family physicians.

**2 Methods**

The study received approval of the institutional ethics committee of both Clalit Health Services and the institutional review board of the

University of Haifa. Data collected for the purpose of the study were saved in a coded manner, to protect the patients' privacy. This observational study was conducted in five community-based secondary pain clinics.

## 2.1 Patients and Participating Clinics

The patients who participated in this study either belonged to the practices of the primary physicians who conducted the study, or were referred for consultation by fellow family physicians. All participants' visits in the five clinics were documented in a digital medical records system. Eligibility criteria for inclusion in the study were the presentation of pain as the main complaint, with at least one-week duration. Patients underwent full history taking and physical examination. After a diagnosis was made according to physicians' judgment using the international classification of diseases (ICD)-10 version, they were offered a treatment series in the clinic or were referred to a tertiary pain clinic at a nearby hospital. Data were collected during clinic visits and entered by physicians into a dedicated patient registry.

This multi-center study was conducted in five community-based, secondary pain clinics, managed by specialized family physicians who had undergone extensive pain management training. Three clinics were situated in major cities, one in a small town, and one in a rural setting. The clinics belong to three of the four health medical organizations in Israel (Clalit, Leumit, and Meuchedet).

## 2.2 Data Collected

Consecutive available patients who met the inclusion criteria were invited to enroll in the study. For each patient who agreed to participate, the following information was recorded by the physicians: date of birth, gender, generic quality of life (e.g., general health, physical/mental/social role functioning), pain location, severity, and duration. At each visit, the following were

recorded: the medical diagnosis reached, the treatment given, and the referral for further workup when deemed necessary imaging, expert consultation (such as rheumatologist, orthopedic surgeon, and neurologist). On follow-up visits, self-reported changes in pain were recorded (visual analogue scale of 1–10), including pain intensity, duration, and functional limitations. Self-reported improvement in pain was recorded on a 0–5 point likert scale.

## 2.3 Physicians Participating in the Study

Five family physicians working as secondary pain management practitioners in five community health care clinics participated in the study. These primary care physicians had undergone special training and are certified pain trustees with a diploma in pain and musculoskeletal medicine (see above). Data collected included demographic characteristics; location, duration, and mean intensity of pain on a 10-level visual analogue scale; patients' diagnoses, treatment modality, number of treatments and improvement after treatment (as assessed on follow-up visits); and referrals for imaging or further consultation.

Most patients in Israel have adequate access to their primary care physician. The patients in our sample were referred by other PCPs (predominantly) or by other primary caregivers such as orthopedic surgeons, neurologists and rheumatologists.

## 2.4 Statistical Analysis

Quantitative results were reported as means  $\pm$  SD. All analyses were carried out with the SPSS v12 statistical package.

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## 3 Results

We documented 997 pain patients who attended the five clinics included in this study. We

recorded a total of 2,652 visits for pain management (average  $2.7 \pm 2.8$  visits *per* patient) during 12 mo. Patients' age ranged from 18 to 92 yr (mean  $59 \pm 19$ ). Of the 997 patients, 618 (62%) were female. The mean pain score before treatment was  $7.7 \pm 1.3$ , on a 10-point visual analog scale. Table 1 presents the duration of pain reported by the patients. Most of them reported chronic pain, over 6 mo in duration (Table 1). Forty percent complained of low back pain, 17% of cervical/head pain, and 14% of shoulder pain. Table 2 presents the prevalence of clinical diagnoses reached. Myofascial pain syndrome (MPS) was by far the most prevalent diagnosis (82%), followed by radicular pain (7%), osteoarthritis (6%), and chronic widespread pain (6%). Table 3 summarizes the pain management modalities applied. Dry needling and trigger point injection were the dominant modes of therapy.

Figure 1 presents the short term (up to one month) improvement in pain after treatment. Seventy-five percent of patients reported significant improvement (more than 70%) or complete pain relief. Telephone follow-up was performed at 6 mo to all the patients. Figure 2 presents the

long term (six month) improvement after treatment. Seventy-two percent of the patients reported significant or complete pain relief. In Fig. 3 we compared the self-reported short-term improvement after treatment in acute pain *vs.* chronic pain patients. Patients with acute pain were more likely to report significant and complete recovery than chronic patients.

Referral for further imaging studies was relatively scarce, with only 6% of participants referred to further studies. Likewise, only 5% of the participants were referred for further specialist consultation. Four percent were referred to a tertiary care pain clinic in a nearby hospital for reevaluation, multidisciplinary treatment, or to undergo invasive procedures.

## 4 Discussion

The evolution of pain clinics was driven by the vast demand for their services. This demand is based mainly on the enormous numbers of patients that experience pain and the paucity of adequate solutions in health systems world-wide. In Israel, the majority of pain management services are under the auspices of tertiary care clinics of large hospitals. The establishment of such centers has resulted in rising expectations among patients for treatment and it is a driving force for a change in the way pain management services are organized and commissioned. Although chronic pain treatment is well established, the discrepancy between demand and supply is huge. In Europe, 70% of patients with chronic pain consults their family

**Table 1** Duration of patients' pain (n = 906).

Pain duration	%
1 wk to 6 mo	37%
7–18 mo	27%
19–59 mo	20%
5–10 yr	7%
11–20 yr	6%
>20 yr	3%

**Table 2** Clinical diagnostic characteristics of patients (n = 997).

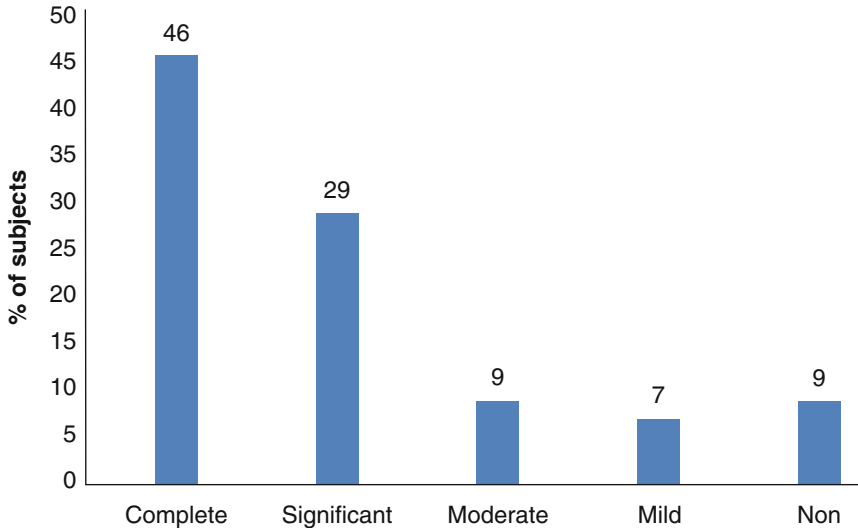
Diagnosis	%
Myofascial pain syndrome (MFS)	82%
Radicular pain	7%
Chronic widespread pain	7%
Osteoarthritis	5%
Migraine	4%
Systemic inflammatory diseases (rheumatoid arthritis, vasculitis)	3%
Nerve entrapment (such as carpal tunnel syndrome)	1%
Other (including cancer pain, post herpetic neuralgia, post-operative pain, complex regional pain syndrome)	6%

**Table 3** Pain management modality applied (n = 972).

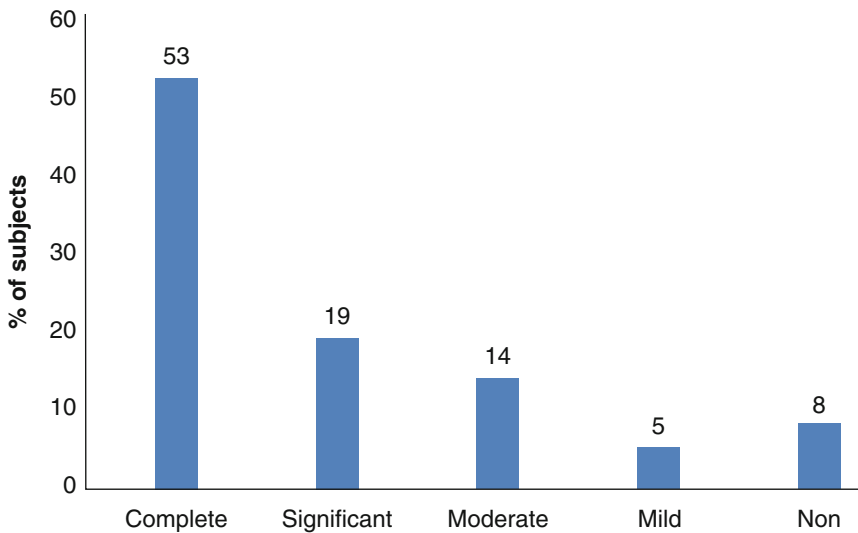
Treatment	%
Dry needling	82%
Pharmacotherapy	38%
Manual myofascial release	23%
Kinesiotaping	7%
Prolotherapy	0.5%

physicians, 28% with orthopedic surgeons, and a mere 2% are managed by pain physicians (Breivik et al. 2006).

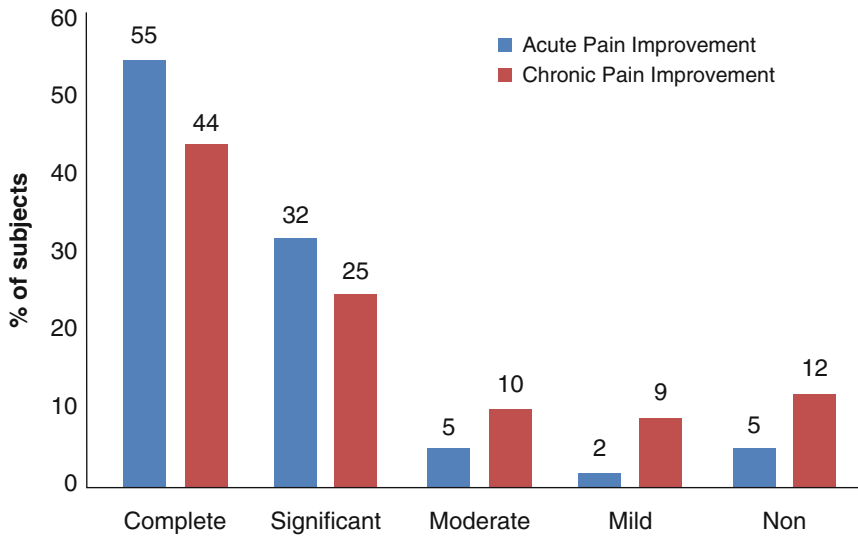
Problems in the management of patients with chronic pain stem from three major issues: (1) high prevalence of chronic pain; (2) lack of knowledge in the management of chronic pain by primary care physicians; (3) poor availability of



**Fig. 1** Short-term, up to one month, improvement in pain perception after treatment. Data are presented for all patients (n = 796).



**Fig. 2** Long-term, more than six month, improvement in pain perception after treatment. Data are presented for patients from three clinics (n = 466).

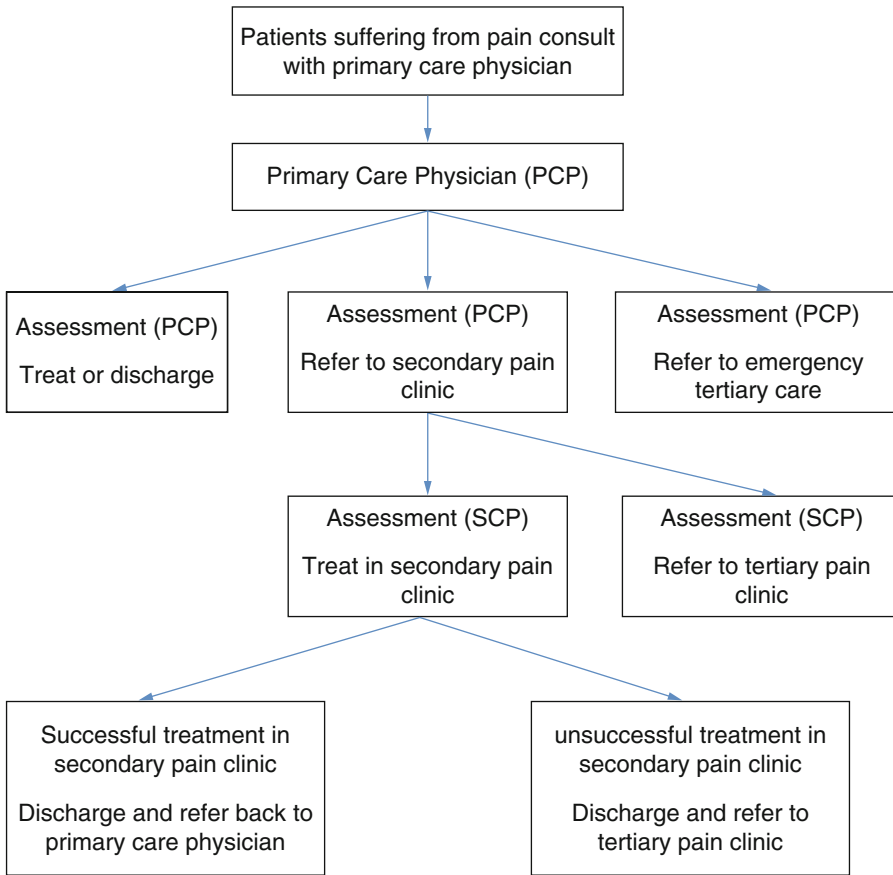


**Fig. 3** Acute versus chronic pain. The graph shows short-term improvements after treatment in acute pain patients ( $n = 238$ ) and in chronic pain (more than six months) patients ( $n = 507$ ).

pain consultancy services. Resolving these challenges is a long process. We describe in this paper outcomes of pain management in five primary care clinics in Israel, run by PCPs who completed a 120-h course in pain management and received practical training at an institute for pain medicine. This study demonstrates the feasibility of training primary care physicians to provide care to 95% of pain patients they see in their daily practice, albeit with a significant educational effort. The vast majority of these patients have musculoskeletal pain, a condition quite neglected in medical schools, family practice, and orthopedic residency programs (Matzkin et al. 2005; Freedman and Bernstein 2002). The workload of PCPs involves the treatment and management of acute and chronic (Gureje et al. 2001). Pain complaints, can comprise up to 40% of the main causes for patients' visits to their family doctors (Mäntyselkä et al. 2001). Thus, primary and secondary pain management services are a favorable solution for managing patients with pain, especially chronic pain. All fields of medicine benefit from community-based medical experts. We believe that pain medicine can also benefit from certified physicians serving as secondary referral addresses, mid-way between primary care

medicine and tertiary pain centers. To date, few such secondary pain clinics are available in Israel, but we have shown that with the appropriate training, PCPs can continue to serve their communities, while handling the vast majority of patients with pain complaints. We represent a flow chart of patients in secondary pain clinics in Fig. 4.

To our knowledge, this is the first study to report the results of a model of care focusing on secondary pain clinics in primary care, characterized by trained physicians whose primary specialty is family practice with additional competence in musculoskeletal and pain medicine. This study highlights the important role of secondary pain clinics in promoting optimal care for persons with pain. Such clinics offer care at the forefront of their patients' interface with the healthcare system and are particularly well positioned to identify gaps and strengths of the healthcare system, with its attempts to improve pain care. Other models exist, with varying degrees of emphasis on primary care physician empowerment in knowledge and treatment skills (Speerin et al. 2014). In such models, additional elements are also found such as patient education, web-based information and community-based group therapy. Our model was aimed and



**Fig. 4** Flow-chart for patients in secondary pain clinics.

targeted at the deficiency of knowledge and skill that primary care physicians have, and in reducing that gap. Although the training is quite intense (300 h), the rewards appear to be clear.

The Veterans Health Administration has introduced a national pain care strategy to meet the needs of veterans, called Stepped Care Model for Pain Management (VHA Directive 2009-053). The program emphasizes an individualized approach to pain management. This model provides diagnosis and treatment of pain patients within primary care. As medical problems increase in complexity or patients fail to achieve treatment goals with more conservative interventions, they are referred to specialized care and interdisciplinary approaches. The advantages of this model include greater accessibility to pain management, fewer referrals,

reductions in treatment costs and empowering of the primary physician. This model, which has some resemblance to our model, is advocated by the American Academy of Pain Medicine (Dubois et al. 2009), and it has been cited by the Institute of Medicine as a potentially important model of care for pain management (Steglitz et al. 2012).

Of our patients included in the current work, 82% were diagnosed with myofascial pain syndrome (MPS). Myofascial pain is one of the most common sources of pain (Skootsky et al. 1989) and it is a major reason of disability and dysfunction (WHO 2003). Patients present with symptoms such as back pain, headache, limb pain, and neck and shoulder pain. If left untreated, myofascial pain can lead to chronic pain syndromes (Kalichman and Vulfsons 2010;

Gerwin 1995). The prevalence of myofascial pain in pain management centers is high. Fishbain et al. (1986) have reported myofascial pain as the primary cause of pain in 85% of patients in a US pain center. Myofascial pain has a lifetime prevalence of 85% in the general population (Fleckenstein et al. 2010). Our reported prevalence of myofascial pain resembles that found in a study of Fogelman and Kent (2015) in which myofascial pain was the primary cause of pain in 74% of cases. MPS is a treatable condition that can be well managed by manual, needling, and injection techniques. However, the syndrome is often undiagnosed by physicians. This is due likely to a lack of knowledge of this disorder and especially a lack of knowledge and tools regarding treatment. Regarding the high prevalence of MPS found in the present study, we note that all five participating PCP had thorough education and knowledge of the syndrome; thus possibly displaying a bias toward this diagnosis. In addition, it is possible that the cases referred to these PCPs were a non-random sample of pain patients, but those with a preponderance for myofascial pain. For example, patients with ongoing cancer therapy could be treated by their oncologists and pain specialists in a tertiary pain setting and were not part of our sample.

Pain is a multifactorial experience associated with physical, psychological, and emotional factors that play important roles in patients' disability and quality of life. The participating PCPs are trained in the biopsychosocial approach, and although not investigated in the current work, this approach was inherent in the treatment of all patients. In all the pain management clinics involved in this study, dry needling was the most common treatment for patients with pain complaints. This is evidence-based safe and effective technique that is widely accepted and used in Israel and in other countries to treat MPS (Halle and Halle 2016; Kietrys et al. 2013; Henschke et al. 2010). The method is based on inserting needles into the muscles involved, to relieve the intensity of pain and improve the range of motion. Trained instructors of the Israeli Society for Musculoskeletal Medicine offer

courses in dry needling to family practitioners. This is important due to a high prevalence of MPS and the ease of administration of dry needling in the primary care setting.

A small proportion of patients in our clinics were referred to imaging studies for evaluation of their pain problems. Some of the patients were referred by physicians from other disciplines such as orthopedic surgeons, rheumatologists, and family practitioners; and already had imaging studies performed upon entry into the current study. Even so, the physicians participating in this study used accepted guidelines for further referral to imaging; the rate of that referral was low. Thus, it would seem that with thorough medical history taking and physical examination, most pain problems can be diagnosed in a community setting, without further imaging.

This study was performed in five community based clinics in Israel, in different settings (city, town, and rural-based clinics), managed by three health maintenance organizations. The population was heterogeneous, yet all patients were entitled to uniform primary care medical services according to the Israeli health care basket. The diagnoses reached, treatments offered, and clinical outcomes were remarkably similar, despite significant differences in patient demographics. Nonetheless, lack of a control group is a limitation of this observational study. The paucity of pain consultation services is striking. In Israel, only 80 physicians are board-certified in pain medicine, 22 residents and approximately 20 other physicians work predominantly in the field of pain medicine (data from the Israel Pain Association). In a country of 8.8 m citizens, there is thus approximately one pain specialist per 100,000 population. Patients who suffer from pain are seen primarily by family physicians. Since most of these physicians did not receive sufficient training in pain treatment, either as students or as residents, their knowledge in the field is based primarily on postgraduate education, which is often deficient. During recent years, educational programs have provided training to PCPs in pain management; yet the number of participants is still small.



Secondary care physicians in pain medicine are certified in CME programs in pain and musculoskeletal medicine, having gained extensive knowledge and proficiency in the field. They are able to manage a large portion of patients suffering from pain in the community, especially those with more complex and persistent pain problems. Shifting the management of chronic pain patients from tertiary centers to the community, including referrals to secondary pain clinics, will necessitate a profound change in the training of physicians at various levels of treatment. The efficacy of this shift must be evaluated with measurable parameters. In the biological realm, this includes such parameters as visual analogue scale, the use of pain medication, days off from work and physician visitation rates. In the psychosocial realm, this includes the measures of quality of life and disability .

In summary, cost effective strategies that improve the management of pain in the primary care setting are urgently needed. In this paper we described a novel patient-centered pain care model by which certified physicians serve as secondary referral addresses, mid-way between primary care medicine and tertiary pain centers. We believe that such model holds promise for the future of pain management in primary care. More studies are needed to examine the pain improvement outcomes of this strategy.

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**Conflicts of Interests** The authors declare no conflicts of interest in relation to this article.

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## References

- Breivik H, Collett B, Ventafridda V, Cohen R, Gallacher D (2006) Survey of chronic pain in Europe: prevalence, impact on daily life, and treatment. *Eur J Pain* 10:287–333
- Carmeli E (2014) The invisibles: unpaid caregivers of the elderly. *Front Public Health* 2:91
- Declaration of Montréal (2017) <http://www.iasp-pain.org/DeclarationofMontreal?navItemNumber=582>. Accessed 25 Jan 2017
- Dubois MY, Gallagher RM, Lippe PM (2009) Pain medicine position paper. *Pain Med* 10:972–1000
- Dueñas M, Ojeda B, Salazar A, Mico JA, Failde I (2016) A review of chronic pain impact on patients, their social environment and the health care system. *J Pain Res* 9:457–467
- Fishbain DA, Goldberg M, Meagher BR, Steele R, Rosomoff H (1986) Male and female chronic pain patients categorized by DSM-III psychiatric diagnostic criteria. *Pain* 26:181–197
- Fleckenstein J, Zaps D, Rütger LJ, Lehmeier L, Freiberg F, Lang PM, Imrich D (2010) Discrepancy between prevalence and perceived effectiveness of treatment methods in myofascial pain syndrome: results of a cross-sectional, nationwide survey. *BMC Musculoskelet Disord* 11:32
- Fogelman Y, Kent J (2015) Efficacy of dry needling for treatment of myofascial pain syndrome. *J Back Musculoskelet Rehabil* 28:173–179
- Freedman KB, Bernstein J (2002) Educational deficiencies in musculoskeletal medicine. *J Bone Joint Surg Am* 84:604–608
- Gerwin RD (1995) A study of 96 subjects examined both for fibromyalgia and myofascial pain. *J Musculoskelet Pain* 3:121
- Gureje O, Gregory ES, Von Korff M (2001) Cross-national study of the course of persistent pain in primary care. *Pain* 92:195–200
- Halle JS, Halle RJ (2016) Pertinent dry needling considerations for minimizing adverse effects- part two. *Int J Sports Phys Ther* 11:810–819
- Henschke N, Ostelo RW, van Tulder MW, Vlaeyen JW, Morley S, Assendelft WJ, Main CJ (2010) Behavioural treatment for chronic low-back pain. *Cochrane Database Syst Rev* 7:CD002014
- Kalichman L, Vulfsons S (2010) Dry needling in the management of musculoskeletal pain. *Am Board Fam Med* 23:640–646
- Kietrys DM, Palombaro KM, Azzaretto E, Hubler R, Schaller B, Schlussel JM, Tucker M (2013) Effectiveness of dry needling for upper-quarter myofascial pain: a systematic review and meta-analysis. *J Orthop Sports Phys Ther* 43:620–634
- Kroenke K (2014) A practical and evidence-based approach to common symptoms: a narrative review. *Ann Intern Med* 161:579–586
- Leverence RR, Williams RL, Potter M, Fernald D, Unverzagt M, Pace W, Parnes B, Daniels E, Skipper B, Volk RJ, Brown AE, Rhyne RL, Net Clinicians PRIME (2011) Chronic non-cancer pain: a siren for primary care -a report from the PRImary care MultiEthnic network (PRIME net). *J Am Board Fam Med* 24:551–561
- Lincoln LE, Pellico L, Kerns R, Anderson D (2013) Barriers and facilitators to chronic non-cancer pain management in primary care: a qualitative analysis of primary care providers' experiences and attitudes. *J Palliative Care Med* S3:001

- Mäntyselkä P, Kumpusalo E, Ahonen R, Kumpusalo A, Kauhanen J, Viinamäki H, Halonen P, Takala J (2001) Pain as a reason to visit the doctor: a study in Finnish primary health care. *Pain* 89:175–180
- Matzkin E, Smith EL, Freccero D, Richardson AB (2005) Adequacy of education in musculoskeletal medicine. *J Bone Joint Surg Am* 87:310–314
- Mehta N, Inturrisi CE, Horn SD, Witkin LR (2016) Using chronic pain outcomes data to improve outcomes. *Anesthesiol Clin* 34:395–408
- Minerbi A, Vulfsons S (2013) Pain medicine in crisis – a possible model toward a solution: empowering community medicine to treat chronic pain. *Rambam Maimonides Med J*:e0027
- Peppin JF, Cheatle MD, Kirsh KL, McCarberg BH (2015) The complexity model: a novel approach to improve chronic pain care. *Pain Med* 16:653–666
- Skootsky SA, Jaeger B, Oye RK (1989) Prevalence of myofascial pain in general internal medicine practice. *West J Med* 151:157–160
- Speerin R, Slater H, Li L, Moore K, Chan M, Dreinhöfer K, Ebeling PR, Willcock S, Briggs AM (2014) Moving from evidence to practice: models of care for the prevention and management of musculoskeletal conditions. *Best Pract Res Clin Rheumatol* 28:479–515
- Steglitz J, Buscemi J, Ferguson MJ (2012) The future of pain research, education, and treatment: a summary of the IOM report “relieving pain in America: a blueprint for transforming prevention, care, education, and research”. *Transl Behav Med* 2:6–8
- Thomsen AB, Sørensen J, Sjøgren P, Eriksen J (2002) Chronic non-malignant pain patients and health economic consequences. *Eur J Pain* 6:341–352
- Turk DC, Fillingim RB, Ohrbach R, Patel KV (2016) Assessment of psychosocial and functional impact of chronic pain. *J Pain* 17(Suppl):T21–T49
- VHA Directive 2009-053 (2009) Pain Management. Department of Veterans Affairs, Washington, DC
- WHO (2003) The burden of musculoskeletal conditions at the start of the new millennium: report of a WHO scientific group. WHO, Geneva, Switzerland