



# Enhancing Motivation for Change in the Management of Chronic Painful Conditions: a Review of Recent Literature

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## Abstract

**Purpose of Review** The purpose of this review is to evaluate and summarize recent empirical research investigating motivational factors for management of chronic pain and headache disorders.

**Recent Findings** Research on motivation for non-pharmacological treatment of chronic pain and headache disorders has identified factors that influence initiation of and adherence to treatment. To address common factors that inhibit initiation of treatment (i.e., cost, time commitment), several electronic treatments have been developed. Self-efficacy is the most commonly studied psychosocial influence on treatment adherence, with evidence that it is positively correlated with adherence. Other studies have sought to improve adherence to treatment using motivational interviewing interventions.

**Summary** There is currently limited research on how to enhance motivation for initial adherence to non-pharmacological treatment for chronic pain and headache disorders. Instead of enhancing motivation, researchers have looked to reduce barriers to treatment with electronic health treatments; however, many of these studies have focused on intervention feasibility, rather than efficacy or effectiveness. Numerous studies have identified a relationship between self-efficacy and treatment adherence. Although motivational interviewing interventions have been shown to improve adherence to treatment, there is little evidence that they improve treatment outcomes. Recommendations for further investigation include improving interventions to enhance accessibility and adherence to treatment with the goal of improving outcomes, as well as identifying ways to improve treatment initiation and adherence in patients who are currently engaged in long-term opioid therapy.

**Keywords** Motivation · Chronic pain · Headache · Treatment adherence

## Introduction

Chronic pain conditions, including headache disorders, are highly prevalent, with an estimated 20% of American adults reporting chronic pain [1] and 15% of American adults reporting migraine or severe headache in the past 3 months

[2]. Pharmacological approaches are generally considered first-line treatments for management of headache disorders, specifically, and for chronic pain, more generally. However, there is growing concern about the risks of pharmacological approaches such as long-term opioid therapy [3, 4]. There is growing evidence of the efficacy and effectiveness of non-pharmacological treatment options for these conditions, including psychological/behavioral treatments (e.g., cognitive-behavioral therapy for chronic pain), exercise/movement-based treatments (e.g., physical therapy, exercise), and manual treatments (e.g., acupuncture). Recently published guidelines for the management of chronic pain, including the United States National Pain Strategy, recommend use of evidence-based non-pharmacological approaches while reducing reliance on opioid therapy [3–5]. Despite these recommendations, a range of organizational, provider, and patient barriers to engaging in non-pharmacological approaches for chronic pain management limit uptake of these approaches, and even

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when patients seek these treatments, participation in and adherence are poor [6, 7].

It is in this context that patient motivation for engaging in non-pharmacological approaches to chronic pain and headache management looms large. Patient motivation is particularly relevant for approaches that require active participation and behavior change on the part of patients in the service of promoting adaptive pain self-management. It is important to identify what motivates patients to engage in non-pharmacological treatments, particularly treatments promoting active pain self-management, as well as to understand factors that influence the maintenance of these self-management behaviors. This review will provide an overview on the theoretical perspectives on motivation for non-pharmacological treatment in chronic pain and headache. To examine trends in the current empirical literature, empirical work investigating motivation for change in the management of chronic painful conditions from the last 3 years will be highlighted.

## Literature Search Strategy

We searched the clinical and scientific literature using Google Scholar and PubMed databases for articles using the search terms listed in Table 1. We restricted the search to articles published between January 2015 and the current date, with the first search taking place in November 2018. We repeated this search in January 2019 to include articles published or accepted since the initial search date. To ensure no relevant articles were missed, we reviewed reference lists of the selected articles. We also reviewed articles that cited the initial validation of the Pain Stages of Change Questionnaire [8] and the development of the Motivational Model of Pain Self-Management [9].

## Theoretical Perspective of Motivation for Treatment

Despite the demonstrated efficacy of non-pharmacological treatment of chronic pain, a significant number of patients either never engage in or do not complete these treatment modalities [10]. This observation led to an adaptation of the transtheoretical model of behavior change to one exploring readiness to adopt a self-management approach to chronic pain. An initial step in this line of research was the development of a measure of readiness for pain self-management, the Pain Stages of Change Questionnaire (PSOCQ) [8]. The PSOCQ consists of a set of beliefs consistent with four hypothesized “stages” of readiness: (1) Precontemplation (e.g., “The best thing I can do is find a doctor who can figure out how to get rid of my pain once and for all); (2) contemplation (e.g., “I’m starting to wonder whether it’s up to me to manage

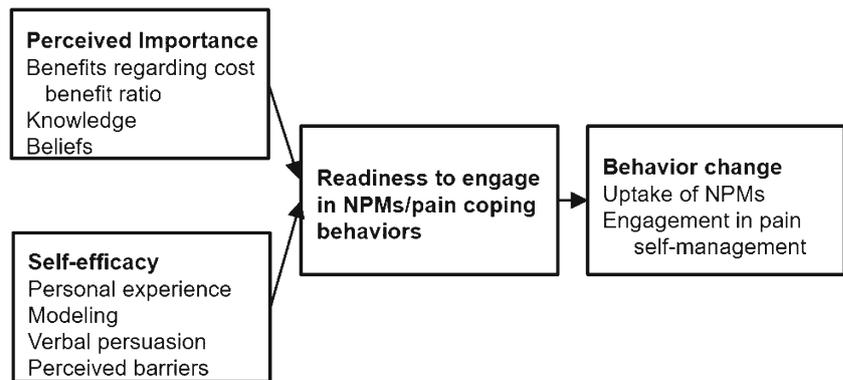
**Table 1** Search terms used for review

Motivation pain treatment	Motivation headache treatment
Motivation chronic pain	Motivation headache
Chronic pain treatment engagement	Headache treatment engagement
Patient activation chronic pain	Patient activation headache
Self-efficacy chronic pain	Self-efficacy headache
Patient engagement chronic pain	Patient engagement headache
Pain change	Headache change
Chronic pain adherence	Headache adherence

my pain rather than relying on physicians”); (3) action (e.g., “(e.g., I am learning ways to control my pain other than with medications or surgery”); and (4) maintenance (e.g., “I have learned some good ways to keep my pain problems from interfering with my life”). A large and growing body of research has documented the predictive validity of the measure by demonstrating that PSOCQ scores are reliably associated with engagement, participation, and adherence during pain self-management treatment and that increased Action and Maintenance scores, characterized as “forward stage movement” over the course of treatment, predicts improved patient outcomes [11]. More recent work has continued to explore the applicability of the PSOCQ in the context of a study designed to examine processes of behavior change during a pain self-management intervention [12, 13].

This line of work contributed to a formal articulation of a Motivational Model of Pain Self-Management [9]. The model incorporates attention to factors that are hypothesized to contribute their specific beliefs about pain self-management, particularly the perceived importance of engaging in self-management behaviors and self-efficacy for engaging in these behaviors. Beliefs about readiness to change are hypothesized to mediate the development and enactment of adaptive pain self-management behaviors and engagement in non-pharmacological approaches to pain management. As seen in Fig. 1, factors that make up perceived importance include expected outcomes and learning history, and factors that make up self-efficacy include personal experience, modeling, verbal persuasion, and perceived barriers. Since this model describes factors that influence a patient’s preparation to engage in pain self-management behaviors (i.e., motivation for self-management of pain), it will serve as the foundation for the review of the recent empirical research on motivation for non-pharmacological treatment approaches to chronic pain and headache. In the remainder of this review, we first examine motivation for initial engagement in non-pharmacological treatment, followed by motivation for continued engagement in non-pharmacological treatments, including pain-related beliefs and self-efficacy related to pain self-management. Finally, we review common perceived barriers to engagement in non-pharmacological pain treatments and potential solutions to overcoming these barriers.

**Fig. 1** Modified motivational model of pain self-management. Note: NPMs = Non-pharmacological pain management behaviors. Adapted with permission from "Toward the development of a motivational model of pain self-management," by Jensen, M.P., Nielson, W.R., & Kerns, R.D., 2003. *The Journal of Pain*, 4, p. 484. Copyright 2003 by the American Pain Society



## Motivation for Initial Engagement in Treatment

Several factors influence patients' willingness to initially engage in non-pharmacological pain management approaches. One cross-sectional study identified that patients with chronic pain report a high level of readiness to engage in pain-related self-care [14]. However, motivation to begin treatment may be hindered by expectations for treatment. One study examining psychological factors and health behaviors among 86 adults with chronic musculoskeletal pain reported that patients with chronic pain tend to have expectations for treatment in line with those expected based on research outcomes in behavioral pain management (i.e., expectation of modest improvements in pain intensity, fatigue, distress, and pain-related interference as a result of engaging in self-management behaviors such as relaxation and activity pacing). However, when asked the level of improvement they would need to experience to engage in all the health behaviors, participants reported that they would need to experience twice the benefit that they expect to accrue (i.e., they do not feel that the modest improvements they would see are sufficient to make engagement in health behaviors worthwhile) [15]. This suggests that although patients have realistic expectations, what they expect does not meet the threshold required for them to engage in treatment. These findings are limited given the relatively small sample size and demographics (predominantly White and well-educated), and because there are no other studies replicating these findings.

Expectations prior to treatment may be related to pain intensity; a study by Day and colleagues found that baseline pain intensity was positively related with pretreatment motivation and expectations for a mindfulness-based cognitive therapy for headache pain [16]. Patients with higher baseline pain rated their confidence that the treatment would work as higher, as well as reporting more initial buy-in to the logic of the treatment. However, those findings must be interpreted with the caveat that results were only analyzed for participants who attended at least half of the treatment sessions, meaning the sample may have been more motivated for treatment than the population it represents. Further, those findings contrast

with earlier work by Kerns and Rosenberg, who found that pain intensity was not predictive of engagement or participation in psychological treatment for chronic pain [17]. This discrepancy may exist because Kerns and Rosenberg included participants who did not complete treatment in their analyses, while Day and colleagues did not.

Patient expectations for treatment are further complicated when comparing expectations that are valued by patients and providers. Patients tend to focus on reducing pain intensity, while providers emphasize improvements in functioning [18]. Although cognitive-behavioral therapy has been found to decrease subjective pain ratings [19], the treatment is primarily focused on improving pain-related functioning [20]; one might expect this discrepancy in focus could reduce patient motivation for psychological treatment for chronic pain. However, patients with a positive therapeutic relationship with their provider may accept recommendations for chronic pain treatment despite disagreeing on treatment goals [21], suggesting that a strong patient-provider relationship can help overcome the barriers for treatment presented by these expectations. This is further supported by the findings from a recent review on headache interventions, which concluded that providers can address barriers for treatment by targeting problematic beliefs and attitudes regarding treatment with education, encouragement, and by managing expectations [22], expanding on previous findings that empathy and education can enhance initial engagement in therapy for pain self-management [23]. This review advocated for assessing for negative beliefs and attitudes and using those findings to determine if non-pharmacological treatment is appropriate, as well as bolstering of positive beliefs and attitudes (such as enhancing self-efficacy through motivational interviewing) prior to treatment to promote engagement and adherence.

Motivation to engage in non-pharmacological treatment becomes more complicated when patients are already engaged in pharmacological treatment, especially long-term opioid therapy. One analysis of recruitment for a non-pharmacological intervention found that patients who are currently prescribed opioids were less likely to enroll in the study [24]. While providers may be more focused on minimizing

harmful side effects from pain medications such as opioids [18], patients prescribed long-term opioid therapy for chronic pain often believe that they are reliant on their medications and that opioids are the only way to manage their pain effectively [25]. These pervasive beliefs result in lower motivation to engage in non-pharmacological treatment, a sentiment echoed by providers who state that initiation of opioid therapy makes patients less receptive to these types of treatments [26]. These findings regarding these beliefs are limited in that both studies were conducted in a relatively small samples ( $N=25$  and  $N=26$ , respectively) of veterans, meaning findings may not be generalizable to civilian populations. Brief motivational interviewing has been found to be an effective measure to combat the low motivation to change in patients prescribed long-term opioid therapy [27]. Given that some of the primary mechanisms of motivational interviewing are examining values, addressing barriers, and eliciting a patient's motivations to change, it should come as no surprise that it is an effective intervention for addressing ambivalence in patients towards engaging in treatment.

Treatments consistent with patient preference may also increase initial engagement; one qualitative study found that patients attending group psychotherapy for chronic pain expressed a desire for social support as their primary reason for attending group therapy, although attendance to the first appointment was the largest hurdle [28]. These findings should be interpreted with caution, because although the study collected rich, qualitative data, the sample size was quite small at 12. Another study on exercise therapy found that patients were more likely to engage in exercise programs when the programs offered were considered enjoyable and relevant to their needs [29]. Although previous studies have identified that tailoring treatment to individual patient needs does not enhance participation in treatment [12], these findings suggest that treatments that are personally relevant to patients' preferences may increase initiation of treatment. Taken together, the literature suggests that although patients are motivated for treatment, negative thoughts and beliefs regarding treatment result in low treatment initiation.

## Adherence to Treatment

Once engaged in non-pharmacological treatment, several factors influence how well patients adhere to using pain self-management techniques and how long they remain engaged in treatment. Reviews on psychosocial factors that influence adherence to pain self-management, perceived disability, and pain intensity determined that the most studied of these factor is self-efficacy, or one's belief that they can utilize the self-management techniques that they have learned through treatment [30, 31]. This is no surprise, given that models of motivation for pain self-management,

including the aforementioned Motivational Model of Pain-Self Management [9], as well as versions of the Theory of Planned Behavior and Self-Determination Theory that have been adapted for pain [32], include self-efficacy as a primary predictor of readiness to change and maintain new behaviors. A mixed-methods review of 21 trials and 12 qualitative studies examining exercise-based treatment of osteoarthritis determined that participation in an exercise program can improve pain self-efficacy. The authors attributed this finding to education provided in these treatments as well as patients receiving reassurance and advice about the value of exercise [29]. This suggests that, consistent with the motivational model, positive personal experience with pain self-management techniques such as exercise may improve self-efficacy and exercise participation while reducing fear of movement, which may lead to improvements in physical functioning, depression, and pain. The sentiment that self-efficacy is an important part of treatment is echoed by Skidmore and colleagues [33]. These investigators reported that increases in pain self-efficacy mediated the relationship between reduction in depressive symptom severity and reduction in pain intensity among patients participating in a 4-week multidisciplinary pain rehabilitation program. The investigators concluded that pain management and rehabilitation programs for chronic low back pain should explicitly target pain self-efficacy as a part of treatment. A review on headache treatment concurred and further recommended that self-efficacy be both assessed and targeted in non-pharmacological headache interventions [22]. The authors of the review further emphasize that individuals with a more external locus of control regarding their headache are less likely to engage in and adhere to non-pharmacological treatment, identifying this as an additional target for treatment.

One way to enhance locus of control and increase self-efficacy towards treatment adherence that has been studied in chronic pain samples is through motivational interviewing [27]. Motivational interviewing has been relatively well-studied in chronic pain samples, with one meta-analysis reporting increases in short-term treatment adherence [34]. The authors conclude that there is insufficient evidence that this increase in adherence ultimately improves patient outcomes. Further, they state that future studies should aim to investigate not how motivational interviewing impacts adherence, but whether increased adherence through motivational interviewing improves outcomes. Although well-studied in chronic pain samples, only one study has focused on motivational interviewing for headache pain, and that study specifically targeted medication overuse in adolescents [35]. Further research is required to determine if motivational interviewing can ultimately improve treatment outcomes in chronic pain conditions, especially headache.

After treatment has concluded, it is important that patients continue practicing pain self-management skills to maintain benefits from the intervention. In one study of participants in an interdisciplinary pain management program in Canada, patients reporting high levels of goal attainment in treatment were more likely to report improvements in several domains, including emotional distress, general health, activity engagement, readiness to change, and adaptive coping strategies [36]. Combined with the fact that patients often have high expectations for treatment which are not always consistent with expected outcomes [15, 18], this lends further support for the importance of providers addressing unrealistic beliefs in order to facilitate the best possible outcomes for treatment [22]. If patients have realistic expectations for treatment, they are more likely to believe that they have reached their goals, and therefore more likely to maintain their pain self-management behaviors and reap the benefits of treatment.

## Overcoming Barriers to Treatment

Thus far, this review has detailed motivational factors associated with patient engagement and adherence to non-pharmacological treatment. However, in addition to factors that increase motivation, other barriers to treatment access, engagement, and participation should be considered. These factors include those that may reduce motivation or may prohibit patients from receiving treatment, regardless of their motivation. Patient-identified barriers to non-pharmacological pain treatment include a lack of time, cost, transportation, and low motivation [26, 37]. From a provider perspective, patient skepticism regarding the efficacy of non-pharmacological treatments is a barrier for treatment, especially for patients who are engaged in long-term opioid treatment [26]. In addition to the aforementioned studies focused on increasing motivation, significant effort has been made to identify ways to reduce the barriers to treatment. One such way to reduce these barriers is to offer multiple methods of treatment delivery [38], especially those that address time concerns (including length of treatment, time spent in transit, and being available outside of normal work hours), cost of treatment, and lack of transportation. Electronic health (eHealth) treatments, which are delivered via internet, phone, smartphone application, or other devices, fulfill these needs, and many of these approaches have received increasing attention in recent years as acceptable alternatives to in-person psychotherapy. Like interventions delivered face-to-face, adherence or continued engagement with an eHealth treatment is an especially important consideration, given that recent observational work reported low rates of engagement with a migraine self-monitoring app; this paper also reported that involvement of a provider increased

app use, while presence of anxiety was associated with less adherence to completing self-monitoring in the app [39].

Two recent papers reviewed the use of eHealth treatments for chronic pain. The first such review investigated the effectiveness of eHealth interventions for headache disorders [40]. This review determined that eHealth interventions for headache were acceptable to patients, but that treatment outcomes varied widely across the 23 reviewed articles, leaving questions about the efficacy of these treatments. Of note, they found that most of these studies did not utilize mobile devices, and those that did used Personal Digital Assistants or other devices, rather than smartphones. Given the prevalence of smartphones, future studies should investigate the use of smartphone apps, as they can be more easily integrated into a patient's daily life than existing eHealth interventions. The second review looked at the effectiveness of eHealth home exercise interventions for patients with osteoarthritis of the knee [41]. Seven studies were identified that utilized internet-based programs, mobile apps, and telephone-supported exercises programs. The authors concluded that these interventions resulted in lower pain, improved physical function, and increased health-related quality of life, with short-term evidence being of low to moderate quality and long-term evidence being of moderate to high quality. They noted that effect sizes were small; however, the effect sizes of these eHealth interventions were not compared to the effect sizes for in-person exercise interventions for osteoarthritis of the knee, so it is unclear how large the gap is between traditional and eHealth interventions. Taken together, these two reviews suggest that there is significant room for improvement for eHealth interventions, at least for headache interventions and exercise interventions for osteoarthritis of the knee.

Two recent trials reported on results of eHealth delivery of cognitive-behavioral therapy (CBT) for chronic pain, both finding favorable results in patient-reported outcomes. The first such trial developed an internet-delivered CBT for pediatric patients with chronic pain and their parents [42]. Compared to participants in an education control group, participants who received the intervention had significantly reduced physical activity limitations 6 months post-treatment. Follow-up analyses found that patients and their parents were both highly engaged with and adhered to the intervention; however, contrary to their hypotheses, patient engagement was not related to outcomes, and parental engagement was negatively related to outcomes [43]. The authors attribute this to the possibility that parents may increase their engagement in treatment when their child is not seeing improvements, or the possibility that parents are revisiting the content because of a lack of comprehension during the first visit. A limitation of many of the studies reviewed, as well as this study by Alberts and colleagues, is that outcomes are not anchored by a comparison to in-person treatment. To truly understand if eHealth

interventions are alternatives worth considering, they must be analyzed in comparison to their in-person counterparts.

The Cooperative Pain Education and Self-management (COPEs) trial sought to do just that, with a hypothesis that an interactive voice response-based CBT intervention (IVR-CBT) would be non-inferior to traditional in-person CBT in a sample of Veterans with chronic back pain [44]. Participants randomized to IVR-CBT answered daily IVR calls to report on their pain and function and were given a treatment manual with ten modules of content covering traditional CBT for chronic pain modules (e.g., progressive muscle relaxation, time-based pacing), and they were given personalized pre-recorded weekly feedback from a therapist. Participants in both treatment groups experienced improvements in physical functioning, sleep quality, and physical quality of life at 3 months post-baseline. There was no advantage for either treatment, suggesting that IVR-CBT is non-inferior to in-person CBT. Further, treatment adherence was higher for the IVR-CBT group, with participants in that group attending 2.3 more sessions (out of 10) than participants attending in-person CBT. This is likely due to the lower participant burden of IVR-CBT. One limitation of this intervention was low enrollment rates, with fewer than half of eligible patients enrolling during recruitment [24]. Enrollment was lower for potential participants currently prescribed opioids, an important group to target for non-pharmacological pain management interventions. These findings suggest that even when lowering the barriers for treatment, there must still be some level of motivation for treatment for initial engagement.

## Conclusion

A growing body of literature has analyzed ways to increase patient engagement in and adherence to non-pharmacological treatments for chronic pain and headache, both by enhancing internal motivation for engagement in treatment and lowering barriers to treatment. The existing literature for enhancing initial engagement in treatment is limited. A strong patient-provider relationship has been shown to increase initial motivation for treatment [21], especially if the provider addresses problematic thoughts related to pain treatment [22]. Instead of focusing on enhancing intrinsic motivation for treatment, increasing attention is being devoted to reducing barriers to treatment in an attempt to improve initiation of and adherence to treatment. Many of these studies use technology-assisted interventions, given that these interventions address the most commonly cited barriers to treatment: cost, transportation, and time. Although these interventions have been deemed acceptable in terms of feasibility, few studies have compared results to in-person treatment, leaving questions about the effectiveness of these treatments compared to their traditional counterparts. Considering that patients have high standards for

treatment outcomes for chronic pain, engagement in these treatments is likely to be low unless they are consistently on par with treatments that are already under-utilized. After completing feasibility and acceptability trials for other eHealth interventions, non-inferiority trials will be a key part of identifying the clinical utility of these interventions.

Additional research is also needed investigating motivation for non-pharmacological treatment for patients who are prescribed long-term opioids. Patients prescribed long-term opioid therapy appear to be less likely to engage in [24] and hold more pervasive negative beliefs about non-pharmacological pain management [25, 26]. This is an important group to reach, as guidelines for chronic treatment now caution against the potential harms of long-term opioid therapy for chronic pain [4]. Despite the acknowledgement that this group is resistant to non-pharmacological treatment, there is a dearth of research on how to engage them in these interventions.

After initiation of treatment, self-efficacy appears to be the most important psychosocial factor to target based on both theoretical and empirical findings. Self-efficacy is related to increased adherence to treatment [30, 31] and can also be enhanced through motivational interviewing [27]. However, at this point, there is insufficient evidence that increased adherence to treatment through motivational interviewing improves patient outcomes [34]. To address this, future studies on motivational interviewing should therefore aim to identify how to improve outcomes, rather than only adherence.

There are several limitations to this brief review. Although this review focused on motivation for treatment for chronic pain and headache, the majority of studies on this topic deal with chronic pain exclusively. Participant selection is another potential limitation; patients who elect to participate in non-pharmacological clinical research studies likely have a higher baseline motivation for treatment than the population of patients with chronic pain. Studies collecting qualitative data (e.g., focus groups, interviews) regarding what would encourage patient engagement in these types of treatment may help researchers and clinicians understand how to better reach an audience.

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## Compliance with Ethical Standards

**Conflict of Interest** Brett Ankawi, Robert D. Kerns, and Sara N. Edmond declare no conflict of interest.

**Human and Animal Rights and Informed Consent** This article does not contain any studies with human or animal subjects performed by any of the authors.

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- Of major importance

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