

Behavioral Medicine for Migraine and Medication Overuse Headache

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Primary headaches, including migraine and medication overuse headache (MOH), can be conceptualized as biobehavioral disorders based on the interaction of biological, psychological, and environmental factors. This article reviews empirically supported and efficacious behavioral approaches to the treatment and management of headaches in general, with an emphasis on migraine and MOH from a biopsychosocial perspective. Evidence-based behavioral medicine treatments for migraine and MOH are reviewed, including patient education, cognitive behavioral therapy, and biobehavioral training (biofeedback, relaxation training, and stress management). Information regarding psychological comorbidities and risk factors for progression of migraine and the development of MOH is also reviewed. Strategies are provided for enhancing adherence and motivation, as well as facilitating medical communication.

Introduction

“Behavioral medicine is the interdisciplinary field concerned with the development and integration of behavioral, psychosocial, and biomedical science knowledge and techniques relevant to the understanding of health and illness, and the application of this knowledge and these techniques to prevention, diagnosis, treatment, and rehabilitation” [1]. Behavioral medicine is based upon the biopsychosocial model, which posits that biological, psychological (behavior, cognition, and emotion), and social or environmental factors all play important roles in human functioning [2]. This model maps particularly well onto our understanding of primary headache disorders in general, and migraine and medication overuse headache (MOH) specifically [3]. It accounts for the diversity in pain

expression (eg, severity, duration, and consequences to the individual) by acknowledging the complex interrelationships among genetic, physiological, psychological, social, and cultural contexts that help to shape the individual’s perceptions and response to pain. This model stands in contrast to the biomedical model that conceptualizes pain in terms of more narrowly defined neurophysiological dimensions. The biopsychosocial model is dynamic, recognizing the reciprocal multifactorial influences on pain over time. Headache researchers and clinicians alike recognize that migraine and MOH are best conceptualized and managed as a biobehavioral disorder. Saper et al. [4] noted that MOH is much more than a painful condition residing in receptor physiology, and more aptly recognized it as a condition wherein physiology, cognition, and behavior are intermingled.

Treatment and Management of Medication Overuse Headache

The biopsychosocial model suggests that effective management of a patient with migraine and/or MOH should include the following elements: an effective, safe, and individualized medical/pharmacological treatment plan combined with a multidimensional, patient-centered, behavioral treatment plan [5,6]. A behavioral plan should include the following components: patient education; nonpharmacological interventions that may include empirically validated biobehavioral interventions (ie, cognitive behavior therapy, stress management, relaxation training, and biofeedback); management of comorbid conditions; and enhancement of adherence and motivation.

For several headache disorders, a combination of pharmacological and nonpharmacological approaches has been demonstrated to be more effective than either approach alone [7–11] to help maintain positive outcomes [12] and to improve treatment adherence [13,14•]. Grazzi et al. [12] demonstrated that the addition of behavioral treatment can enhance the outcome of drug treatment alone, with regard to symptom reduction and relapse prevention. Due to a relatively poor response when using pharmacological treatment alone in treating chronic migraine with medication overuse after withdrawal, the authors compared pharmacological prophylaxis alone with pharmacological

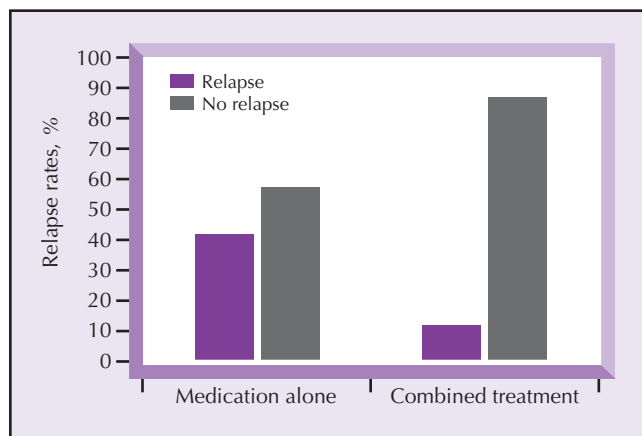


Figure 1. Percentage of patients relapsing to overuse of medication at 3-year follow-up evaluation. (Data from Grazzi et al. [12].)

prophylaxis plus behavioral treatment. The behavioral treatment included a brief course of biofeedback, accompanied by instruction in progressive muscle relaxation training [12]. All participants completed a short, structured in-hospital drug withdrawal program and were immediately placed on a course of appropriate prophylactic medication. Some began the “biofeedback-assisted” relaxation treatment while still at the inpatient unit, and they continued to receive this additional treatment for a total of 8 weeks. Patients were followed for several years. At the 1-year follow-up assessment, significant improvement was seen in participants in both conditions, such that the levels of improvement were indistinguishable statistically and clinically. However, at the 3-year follow-up assessment, patients who received the combined treatment showed a greater reduction in headache symptoms and a lower rate of relapse (return to MOH) than those in the medication-only treatment group. The most striking finding at 3 years was the percentage of patients who received medication alone had relapsed in the intervening period (Fig. 1). Some of the lessons learned regarding optimal ways to address the medication and medical needs of these patients are reviewed in subsequent papers [15,16].

Patient Education for Migraine and Medication Overuse Headache

Patient education is integral to effective management of migraine and MOH. Although MOH is the result of misuse of medication (in both migraine with and without MOH), the patient is the one who decides which attacks to treat, when to treat, how to treat, and what, if any, behavioral or lifestyle changes are attempted [17]. Several studies have shown the value of patient education for favorably impacting pain parameters and for obtaining meaningful improvements in levels of depression, reliance on medical services, functional status, and quality of life [9–12,17,18•]. Lake [19•] suggests that education should include information about MOH, the expected time for improvement after

Table 1. Basic patient education guidelines for providers

- Limit instructions to three or four major points during each discussion
- Use simple, everyday language, especially when explaining diagnoses and treatment instructions (model or demonstrate, when possible)
- Supplement oral instructions with written materials
- Involve the patient’s family members or significant others (especially with chronic disabling conditions, including chronic disabling headaches)
- Ask patient to restate recommendations back to you
- Repeat and reinforce the concepts that were discussed

(From Rains et al. [14•]; with permission.)

withdrawal, and the risk of relapse. In addition, issues that may have led to the MOH condition and/or may contribute to relapse should be reviewed. For example, educating patients on how to properly use abortive agents appears straightforward on the surface, but many patients do not use symptomatic medications properly. In fact, improper timing may be one of the factors leading to overuse. Specific, detailed education can significantly improve self-dosing and resultant effectiveness for both migraine without and with medication overuse [20].

Effectively communicating with and educating patients seems a simple matter, but it is well established that effective patient communication and education is challenging [21,22•,23]. Rains et al. [14•] provide a number of suggestions for maximizing the efficacy and value of patient education (Table 1). Researchers have demonstrated that the use of open-ended questions [24•]—asking about the effect the headache has on the patient’s life (functional impairment) [25] and applying the “Ask-Tell-Ask” strategy [26]—as opposed to close-ended, “yes or no” questions, can lead to more effective communication and better identification of problem areas, as this approach is based on the theory that education requires determining what the patient already knows and believes and then building on that knowledge. Asking patients to repeat back what has been said to them can be especially useful, as it helps identify concepts that have not been grasped and warrant further mention, and concepts that have been misunderstood and need correction. A book chapter by Hahn [22•] offers a review on effective communication strategies as applied to headache treatment as well as clinical vignettes.

Nonpharmacological Treatment and Management Strategies for Medication Overuse Headache

Empirically validated nonpharmacological or biobehavioral interventions for headache management include cognitive behavior therapy, stress management, relaxation

training, and biofeedback. These techniques have been studied and reviewed extensively elsewhere and therefore will be reviewed only briefly [27–29]. Relaxation techniques are taught to minimize physiological responses to stress and decrease sympathetic arousal. Relaxation training may include various techniques such as progressive muscle relaxation training, visual imagery, and self-hypnosis. Biofeedback training is a procedure that involves monitoring and training control of physiological processes of which the patient may not be consciously aware and/or does not believe that he or she has voluntary control. Through practice, patients gain awareness and control over the stress response.

Cognitive behavior therapy (CBT) is an empirically validated psychotherapeutic treatment comprised of cognitive and behavioral strategies. Behavioral strategies help patients identify behaviors that may precipitate, increase, or maintain headaches and/or MOH (including modifying triggers and promoting healthy lifestyle habits). Cognitive strategies focus on identifying and challenging maladaptive or dysfunctional thoughts, beliefs, and responses to stress [30,31]. Specific cognitive goals include enhancing self-efficacy (ie, the patient's belief in his or her ability to succeed or accomplish a certain task), and helping patients gain an internal locus of control (ie, a belief that the mechanism for change lies within oneself) as opposed to an external locus of control (ie, the belief that only the physician, medication, or medical procedures have the power for change) [32]. Research has demonstrated that both poor self-efficacy and external locus of control predict poorer outcomes [33,34]. CBT also may focus on changing "catastrophizing," a hopeless and overwhelming thinking pattern that has been shown to predict poor outcome and reduced quality of life. Holroyd et al. [35] examined catastrophizing, comorbid anxiety, depression, quality of life, and headache characteristics among 232 migraine sufferers and found that catastrophizing and severity of associated symptoms (photophobia, phonophobia, nausea) independently predicted quality of life; these outcomes demonstrated that it is not just headache severity and frequency that predict quality of life, but that patient perception is directly related to quality of life. Other targets of CBT include assertiveness training, increased coping and problem-solving skills, and cognitive restructuring.

Many CBT and relaxation strategies can be provided by the primary care provider, headache specialist, or allied staff. In some cases, however, a referral to a mental health provider (psychiatrist, psychologist, or other appropriate licensed professional) is warranted. One of the biggest challenges for physicians and patients can be locating mental health care providers with expertise in headache, pain, or biofeedback. A list of psychologists with their specialties and location may be found at the websites of the American Psychological Association (<http://www.apa.org>) or the National Register of Health Service Providers

in Psychology (<http://www.nationalregister.org>), and psychologist members of the American Headache Society can be found on its website (<http://www.americanheadache-society.org>). To find practitioners, training, and meetings in Europe, refer to the Biofeedback Foundation of Europe (<http://www.bfe.org>). The Association for Applied Psychophysiology and Biofeedback (<http://www.aapb.org>) is a professional organization of researchers and practitioners of biofeedback. The Biofeedback Certification Institute of America is an organization that certifies biofeedback providers (even though psychologists with proper training may practice biofeedback therapy without being certified or belonging to this organization). A list of certified biofeedback providers is available on its website (<http://www.bcia.org/directory/membership.cfm>). Self-training and home training biofeedback kits and manuals as well as recorded relaxation materials are also available.

Psychological Risk Factors and Comorbidities in Medication Overuse Headache

Lake [19•] has identified the basic psychological issues that are the key contributors to MOH:

- A belief that medication is the only treatment option
- The presence of "cephalalgia phobia," or pain panic (anticipatory fear of pain)
- Intolerance or difficulty dealing with pain
- Soporophilia (seeking sedation)
- The need to continue to function, outside pressures
- The presence of psychiatric comorbidities (Axis I and II of the *Diagnostic and Statistical Manual of Mental Disorders, 4th edition* [DSM-IV])

Migraine and MOH are associated with an increase in comorbid psychiatric conditions, functional impairment across all aspects of life, and reduced health-related quality of life. Psychiatric comorbidity also may be involved in the transformation of episodic headache to MOH. Atasoy et al. [36] compared 58 patients with MOH evolving from episodic migraine, 31 patients with MOH evolving from episodic tension-type headache (ETTH), and 31 patients with chronic tension-type headache (CTTH) without medication overuse using validated diagnostic tools. They found the probability of a comorbid psychiatric condition to be 68% in the MOH with prior ETTH group and 54% in the MOH with prior migraine group, in contrast to only 35% in the CTTH group without medication overuse. Comorbid conditions for which they found significantly higher rates in the MOH groups included depression and obsessive compulsive disorder. Saper et al. [4] noted that it is more than a coincidence that the drugs most often overused have strong anxiolytic and/or sedating effects.

In a clinic-based sample, Radat et al. [37] compared 41 episodic migraine (EM) patients and 41 patients with MOH evolving from prior migraine. Overall, the presence of comorbid psychiatric disorders was significantly more prevalent in the MOH group (OR = 4.5). The increased ORs for the MOH patients were seen in the prevalence of the following disorders: major depression (OR = 21.8), all anxiety disorders (OR = 3.5), panic disorder (OR = 12.1), generalized anxiety disorder (OR = 6.0), social phobia (OR = 4.3), and all substance-related disorders (OR = 7.6). In all of these conditions, the authors found that the onset of the psychiatric disorder was significantly more likely to precede the onset of MOH, demonstrating that the presence of a psychiatric condition may be a risk factor for MOH. The researchers also examined family history data and found significantly elevated risks for mood disorders (OR = 1.7) and substance use disorders (alcohol or illicit drugs, OR = 2.8) in the families of MOH patients. The authors hypothesized that MOH may be due at least in part to a genetic predisposition.

Personality disorders, such as borderline personality disorder (BPD), can create significant challenges in effective management of all headache disorders [38]. One clinic study compared headache-relevant features and treatment outcome for 150 consecutive patients with migraine (50 with psychiatrically diagnosed BPD and 100 patients without BPD) [39]. They found coexisting BPD to be associated with a higher prevalence of MOH, as well as female gender, more pervasive headache, greater migraine-related disability, more unscheduled visits for acute migraine treatment, self-reported depression, and a lower likelihood of responding to pharmacological therapy for headache. Lake et al. [40•] followed 267 patients who completed a multidisciplinary, 14-day, in-patient treatment program for headache: 158 (59%) had MOH, and almost half (48%) used daily opioids. They found that those with personality disorders (DSM-IV Axis II disorders) were significantly more likely to be opioid-dependent than those without Axis II disorders (62% vs 38%) and less likely to attain moderate to significant improvement in head pain by the end of the program (68% vs 81%).

Management of Comorbid Psychiatric Conditions

The heightened presence of comorbid psychiatric conditions among migraineurs including depression, anxiety, social phobia, panic disorder, bipolar disorder, and suicide attempts highlights the importance of screening, assessing, and educating patients about these common comorbidities and treating or making referrals when necessary [41–43]. Maizels et al. [44] reviewed brief screening instruments that are useful for assessing the presence of depression and anxiety. The Patient Health Questionnaire (PHQ)-2 is a 2-item instrument that serves as an effective screen for the

presence of depression [45]. The PHQ-9 [46] can be helpful when a more thorough assessment is needed and a diagnosis (utilizing the DSM-IV criteria [47]) is warranted. Finally, the Generalized Anxiety Disorder-7 can be helpful in evaluating anxiety that is significant and in need of attention [48]. Information obtained from these instruments can be reviewed with the patient. This may facilitate discussion about areas of concern and further inform treatment decisions.

Smitherman et al. [49•] suggest a number of practical strategies for assisting patients with the comorbid conditions of depression and anxiety, many of which can be implemented without extensive training. A number of the strategies they identify apply to both conditions, whereas others are specific to the copresenting condition (Table 2). Further information about addressing comorbid conditions may be found elsewhere in the literature [29,49•,50].

Enhancing Adherence and Motivation

Adherence refers to the degree of active participation by the patient and the collaborative relationship between the patient and the provider in the implementation of a therapeutic regimen. Nonadherence can pose a significant barrier to effective headache management in many ways. Common adherence problem areas in headache treatment include misuse of medication (including unfilled, overused, underused, incorrectly used, and nonadvised discontinuation of prescribed medications or treatments), appointment keeping, record keeping (eg, maintaining a headache diary), and unwillingness or inability to follow clinical suggestions. Improper medication use may not only limit relief but may also aggravate the primary headache condition (eg, lead to medication overuse or rebound headache) [13].

Theoretical models of behavior change provide insight into why this may occur and suggest ways to motivate patients to act [14•,51]. Pivotal to all such models is the notion that behavior change and motivation are based upon three basic components: the patient's readiness for change; the patient's belief that they possess the requisite skills (self-efficacy); and the patient's belief that application of the skills will lead to the desired outcome (outcome self-efficacy). Skills and knowledge alone are not sufficient to ensure behavior change. The patient must want to change, believe that he or she can, and believe that the necessary actions will accomplish the desired goal(s). Application of the "trans-theoretical model" [52] can aid in understanding a patient's readiness and motivation for change, whereas application of "motivational interviewing" techniques [53] may be useful in moving patients to higher stages of action. This approach was initially developed for treatment of addictive and habit behaviors and therefore lends itself well to MOH. The transtheoretical model categorizes a patient's readiness and motivation into one of five stages [52] (Note: This model actually contains a sixth stage, that of *termination*.

Table 2. Strategies for behavioral management of comorbid depression and anxiety

Strategy	Depression	Anxiety
Educate the patient about the relationship between thoughts, behaviors, and emotions	X	X
Articulate that changing thoughts and behaviors can help improve condition	X	X
Advise the patient in initiating a regular program of physical activity/exercise	X	X
Provide training in active coping skills and/or general stress management	X	X
Help the patient realize that he/she can live a valued life despite having chronic pain	X	X
Be alert to the potential for medication overuse and underlying sleep disturbances	X	X
Help the patient develop a plan to identify and increase avoided activities	X	
Increase access to positive reinforcement in the patient's environment	X	
Implement methods for expanding the patient's social support network	X	
Limit exposure to contexts associated with negative emotions	X	
Have the patient chart, hour by hour, his/her activities during the course of a week	X	
Have the patient self-monitor desired behaviors and patterns of negative thinking	X	
Focus on generating rational alternatives to these patterns	X	
Have the patient identify and list his/her positive qualities and achievements	X	
Encourage initiation of a new hobby or action toward achieving a neglected long-term goal	X	
Help the patient identify overt and covert methods of avoiding feared stimuli		X
Decrease avoidance behavior through imaginal or in vivo exposure exercises		X
Have the patient write in a diary about a past traumatic experience and associated emotions		X
Have the patient monitor avoidance behaviors and patterns of negative thinking		X
Focus on generating rational alternative to these patterns		X
Have the patient chart fearful predictions and the actual incidence of their occurrence		X
Incorporate relaxation training (eg, progressive muscle relaxation commonly used with headache)		X
Instruct the patient to set aside 20 to 30 minutes each night for worry (rather than worrying throughout the entire day)		X

(From Smitherman et al. [49•]; with permission.)

However, given the chronic nature of headache, we advocate that patients continue in the maintenance stage.):

- Stage 1. Precontemplation: The patient is not thinking about change, does not recognize the need for change, or does not acknowledge that a problem exists.
- Stage 2. Contemplation: The patient recognizes the need for change or that a problem exists, begins to think about change, may even be developing a plan, but no action is being taken at the moment.
- Stage 3. Preparation: The patient has researched, consulted, gathered information, developed a plan, and may begin making minor changes or implementing actions.
- Stage 4. Action: The patient is actively engaged in behavior change or new desired actions.
- Stage 5. Maintenance: The patient continues the plan and behaviors necessary to maintain changes.

The transtheoretical model emphasizes that change happens over time and progresses through a series of stages. However, progression among the stages is rarely orderly, with patients lapsing from a higher state to a lower state before resuming progress. This and related models prefer the term *lapse* rather than relapse to emphasize that backward movement is not a failure or a permanent state. Health care providers can use information about a patient's stage of readiness for change and tailor their interventions, clinical advice, and education accordingly.

The technique of motivational interviewing focuses on the patient's stage of readiness and explores their beliefs, concerns, perspective, and ambivalence about behavior change [53]. The therapist strives to help the patient realize the importance of change while maintaining an empathic, supportive, nonjudgmental stance. Motivation for change is enhanced when patients are helped to examine the pros and cons of change and arrive at decisions themselves, rather than being passive recipients of instructions from the therapist. This model also identifies the following 10 processes of change

designed to aid movement from one stage to another: consciousness-raising; dramatic relief; self-reevaluation; environmental reevaluation; self-liberation; social liberation; counterconditioning; stimulus control; reinforcement; and helping relationships. These processes of change are divided into two categories: cognitive, which are used to a greater extent in the early stages (ie, 1–3), and behavioral, which are relied upon more in the later stages (ie, 4–5).

Conclusions

Primary headache disorders, including migraine and MOH, can be best understood and managed from a biopsychosocial perspective. Because migraine and MOH are complex combinations of biological, behavioral, and emotional components, the most effective treatment programs include a combination of pharmacological and nonpharmacological approaches. For example, treatment and management of MOH should include a tailored, structured medical/pharmacological withdrawal and management program combined with education and nonpharmacological management strategies. Lake [19•] succinctly summarized the benefits to be gained from incorporating behavioral treatments with medication management when treating MOH when he stated that although behavioral treatments rarely provide the quick relief that can occur with medication, patients undergoing behavioral treatments:

learn to restructure their cognitive approach to pain, in essence learning how to tolerate discomfort, reduce pain-related emotional distress, stop the overly frequent pharmacological preemptive treatment of an impending headache, and reduce limbic escalation of the pain experience. If reinforced and maintained over time, these learned behaviors can help reduce the likelihood of overusing pain medication and MOH relapse.

Through education and CBT, patients can be taught ways to modify thoughts, feelings, and behaviors around medication-taking and headache management strategies. They also can be taught to manage the physiological effects of stress and the prodromal symptoms of a headache attack through biofeedback and relaxation training. Some behavioral techniques can be incorporated by primary care providers during an appointment (eg, communication strategies, education, diaphragmatic breathing, and guided imagery), some can be self-taught and practiced by the patient (eg, relaxation practice and stress management), and some require a referral to an appropriately trained professional (eg, biofeedback training and CBT).

Effective communication is essential for effective management of MOH. Strategies for enhancing communication include active listening such as the “Ask-Tell-Ask” model, demonstration of empathy, and attention given to headache-related impairment, mood, and quality of life. Primary care providers and headache specialists can utilize these strategies with their patients on a daily basis, whether by helping a patient gain a more realistic understanding of their illness, helping a patient recognize the effort and contribution that they themselves must make in their treatment (ie, enhancing self-efficacy and encouraging an internal locus of control), and considering his or her treatment a collaborative process. The strategies reviewed in this article can help build feelings of self-efficacy and encourage patients to actively engage in their treatment of migraine and MOH and avoid progression or relapse.

Disclosure

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No other potential conflicts of interest relevant to this article were reported.

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The authors reviewed psychiatric screening for headache patients, focusing primarily on those that have been validated in medical settings, can be administered quickly, and involve minimal or no cost. They also reviewed strategies for behavioral management of depression and anxiety in headache patients.