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Psychological Approaches to Headache

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INTRODUCTION

As a group, headache disorders are painful and disabling, impacting the lives of people with headache across multiple domains and reducing their ability to be productive and satisfied members of society. The majority of work examining psychological approaches to headache has occurred within the two most prevalent primary headache disorders: migraine and tension-type headache.

Recent epidemiological studies have demonstrated prevalence rates for episodic migraine of 12% across the United States population, including 18% of women and 6% of men.[1] Chronic migraine affects a smaller proportion of the United States population (1–2%), with a higher proportion of women to men similar to episodic migraine, but can be far more disabling because of its chronic nature, and because it is less responsive to available treatments.[2]

Migraine is associated with high levels of disability, and can interfere with the individual's functioning across domains. Migraine has been ranked as the seventh specific cause of disability worldwide,[3] and accounts for more than 1% of years lived in disability.[4] Migraine occurs during the most productive years of life, and has a higher prevalence in women.[5] Migraine can reduce the capacity of individuals to function in social and work environments both during the period of the headache attack (during which a person with migraine may need to completely withdraw to a dark, quiet room), as well as between attacks, during which time a person with migraine may experience anxiety about potential migraine onset and restrict their activities to avoid migraine onset.[6] A burgeoning literature on stigma suggests that migraine patients report greater disease-related stigma than do those with epilepsy, and that much of this stigma is related to work-related productivity,[7] and can even change decision-making about taking acute migraine treatment.[8]

Tension-type headache is a painful condition characterized by episodes of mild to moderate bilateral pressing head pain. Most people experience episodes of tension-type headache at some point in their lives.[9] However, a minority of individuals report experiencing tension-type headache on 15 or more days per month, or chronic tension-type headache. As with chronic migraine, chronic tension-type headache is far more disabling than episodic tension-type headache, and can be less responsive to treatment.[9]

Psychological factors have been considered integral to our understanding of headache since the first recorded information about headaches.[10,11] The term "psychological factors" encompasses a broad range of topics that may contribute to headaches including: patient behaviors during and in-between headache attacks; patient thoughts and beliefs about illness and headaches; and, characteristics of the environment in which patients live and work.

This chapter will describe our current understanding of the role of psychological factors in headache disorders. First, we will review the role of trigger factors and their avoidance in the management of headache disorders, as well as the role of behaviors, thoughts, and psychiatric comorbidities in the onset and maintenance of headache disorders. Then, we will examine the contribution of psychological factors to medical treatment of headache disorders, including medication adherence and patient–physician communication. It should be noted that a large proportion of people with migraine manage their headaches without the assistance of prescription medications[1]; thus, those who seek medical consultation likely have a slightly

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different psychological profile (e.g., feel less control over their headaches), which emphasizes the importance of assessing psychological factors in a treatment-seeking population. Finally, we will describe treatments based on psychological principles that have demonstrated efficacy in headache disorders, including educational strategies, biofeedback and relaxation strategies, and cognitive behavioral treatments, as well as new approaches that are promising avenues for behavioral headache treatment.

TRIGGER FACTORS

Patients often note that encountering certain phenomena or circumstances seems frequently to precipitate, or "trigger," headache episodes. The belief that these factors actually trigger headaches can lead patients to invest time and effort in identifying, avoiding, and mitigating headache triggers. When asked about patient (and healthcare provider) perceptions, most identify a consistent conglomeration of factors that they believe are headache triggers in at least some people, including dietary factors (aged cheese, red wine); situational factors (weather patterns, noxious odors, flickering lights); cognitive factors (stress); and behavioral factors (poor/inconsistent sleep and dietary schedule, physical activity).[12] Healthcare providers often encourage patients to keep track of factors that might trigger their headaches in order to establish their idiosyncratic trigger profile. However, recent evidence suggests that factors commonly thought of as well-established triggers for migraine with aura (strenuous activity and flickering lights) have a low likelihood of actually triggering a migraine with aura (11%) when administered to individuals who report these as salient triggering factors.[13] Further, a study examining fluctuations in three commonly reported triggers (weather, ovarian hormones, and perceived stress) in a daily diary found that the day-to-day variation in these triggers would make it difficult to identify true triggers in an individual person with migraine solely using methods of natural experimentation.[14]

Although identifying unique migraine triggers may be challenging through daily-diary natural experimentation methods, research empirically examining which factors are likely to precipitate migraine episodes may provide useful information that can be broadly applied in clinical situations. Stress, sleep, and some aspects of diet are psychological/behavioral precipitating factors that are modifiable, and therefore have a high clinical utility. It may be helpful for providers to introduce these psychological factors as contributing to reaching the "migraine threshold," a useful concept in migraine education. The migraine threshold can be thought of as a tipping point at which the patient's nervous system generates a migraine. Management of individual psychological "triggering" factors may help people with migraine to avoid reaching the "migraine threshold."

Stress

Stress is one of the perceived triggers most commonly identified across different headache types and clinical populations.[12,15,16] However, the term "stress" is now commonly used in lay-language in a variety of fluid contexts, which might color survey findings. Psychological stress can be defined as the perception that one does not have adequate resources to manage a potentially threatening situation, or stressor.[17] However, lay persons might use the term "stress" to describe a large number of daily hassles (in which "stress" is equated with stressor), or a state of feeling overwhelmed by phenomena in one's life. Thus, in order to meet the definition of psychological stress, the daily hassle or life event (i.e., stressor) must be something that threatens one's typical daily routine or state of being in some way, *and* the individual must have a concern about lack of resources (e.g., psychological resources, time resources, social and environmental support systems) to manage this stressor.[18]

Recent evidence examining day-to-day fluctuations in stress and headache symptoms suggests that stress on a single day may not be related to onset of headache symptoms, but rather stress on one day may impact the presence of headache on the following day.[19,20] In a sample of subjects with chronic migraine or chronic tension-type headache, two consecutive days with elevated stress was associated with the onset of a headache.[20] In a different sample of patients with episodic migraine, a decline in perceived stress from the previous day was associated with onset of migraine, providing evidence for the "let-down" stress phenomenon precipitating migraine episodes.[19]

Stress could impact headache through a variety of mechanisms, but no single mechanism has been convincingly demonstrated in empirical research. The biological reaction of stress, activation of the hypothalamic−pituitary axis and sympathetic nervous system, could be associated with migraine onset.[18] From a behavioral perspective, stress on one day might increase the presence of more proximal behavioral precipitating headache factors, such as poor sleep or diet.[19] It has also been posited that the prodromal symptoms of headache itself might change the perception of one's ability to successfully cope with one's constant levels of daily hassles. In other words, headache might change one's perceived ability to manage the daily hassles that commonly arise in one's life.[21]

These are each plausible mechanisms that deserve continued study.

The impact of stress reaches beyond attacks, and may be associated with chronification of migraine (in which migraine attack frequency increases from episodic migraine to meet criteria for chronic migraine).[22] A population-based study found that greater numbers of major life changes were associated with migraine chronification.[23] Again, more research must be conducted to ascertain mechanisms through which stress influences headache chronification. Stress may play a role in headache chronification through influencing other factors potentially more proximal to chronification (medication overuse, consumption of caffeine), or more directly through physiological processes such as central sensitization.[18] Further, additional work is needed to determine whether intervening with stress can prevent headache chronification in individuals with headache and high levels of stress.

Interventions that focus on stress management have demonstrated efficacy to treat both migraine and tension-type headaches.[24,25] Stress management training typically incorporates both behavioral and cognitive interventions. Behavioral interventions specifically to manage stress might include relaxation techniques (progressive relaxation, deep breathing, autogenic training, imagery), biofeedback, and increasing activities with stress-reducing properties, such as exercise. Cognitive aspects of stress management interventions might include awareness of when one's stress level is increasing, identification of thoughts that are initiating and maintaining high levels of stress, and modifying maladaptive patterns of thinking to increase a sense of self-efficacy to manage life stressors.

Sleep

Sleep plays an important role in headache. Primary headache disorders such as migraine, tension-type headache, and cluster headache are influenced by sleep. Disturbances in the normal pattern of sleep are commonly perceived to be headache triggers: going to bed later than usual, getting up earlier than usual, oversleeping, or disruptions in sleep pattern due to work or jet lag.[26] Empirical evidence suggests that two consecutive nights of sleep disturbance have been associated with onset of migraine and tension-type headache, and sleep disturbance can build upon daily stress to precipitate headache onset.[20]

Several patterns of primary headache disorders, including morning headaches, headaches that awaken the patient from sleep, and chronic daily headaches, are associated with sleep disorders.[27] Insomnia is the most prevalent sleep disorder in chronic migraine and tension-type headache. Sleep apnea commonly occurs in individuals with cluster headache and chronic daily headache patterns. Further, sleep apnea is associated with a secondary headache disorder – sleep apnea headache – that occurs within the context of a diagnosis of sleep apnea, characterized by bilateral pressing headaches that present on awakening, resolve within 30 minutes, occur on more than 15 days per month, and resolve upon successful treatment of sleep apnea.[28] Circadian rhythm disorders are common in people with migraine, and recent evidence suggests that a genetic mutation associated with severe familial advanced sleep phase may be associated with migraine with aura.[29]

Few studies have examined the effect of sleep treatment on headache, although existing evidence suggests that treating sleep disturbances may improve some headaches. Treating sleep apnea with continuous positive airway pressure (CPAP) can improve sleep apnea headache.[30] One study demonstrated that in veterans from the war in Iraq and Afghanistan presenting with comorbid headache and insomnia, headache days and severity improved when veterans were treated for insomnia with education and pharmacotherapy.[31] Cognitive behavioral treatments have demonstrated efficacy to treat sleep disturbances, with the strongest evidence for the treatment of insomnia.[32] Cognitive behavioral treatments for insomnia reduce conditioned arousal related to the sleep environment, ineffective or harmful habits developed in an effort to improve sleep, and sleep-related worry. Common elements of cognitive behavioral therapy for insomnia include: stimulus control (e.g., only go to bed when truly sleepy, maintain a regular rise time, reduce napping); reduce sleep-interfering activation (e.g., undertake relaxation techniques, avoid stimulants and exercise later in the day); and sleep restriction. A recent trial demonstrated that a 12-week cognitive behavioral sleep intervention improved headache symptoms in individuals with chronic migraine.[33] It provides promising preliminary evidence supporting the use of these interventions in headache sufferers.

Diet and Obesity

Given the inconsistent evidence regarding foods perceived to trigger headache, and the sheer number of foods thought to trigger headache, simply avoiding these foods is unlikely to improve headaches in an individual patient. Additionally, this strategy runs the risk of exacerbating headaches through reinforcing maladaptive avoidance coping.[26] In one double-blind study, chocolate was no more likely than carob (a chocolate-like substance) to trigger a migraine across

all participants, regardless of whether participants believed chocolate to be a migraine trigger.[34] Dietary recommendations appear to be most effective when individualized. For example, a randomized clinical cross-over trial showed that a diet eliminating foods to which people with migraine demonstrated an immune reaction (elevated IgG antibodies) reduced headache days and migraine attacks.[35]

Obesity is prevalent among people with migraine[36] and is associated with higher headache frequency and severity among people with migraine.[37] Obesity is further associated with the change of migraine (but not tension-type headache) from an episodic to a chronic condition.[38] Behavioral interventions that incorporate monitoring and modification of diet and physical activity can be efficacious to modify weight. However, changes in eating patterns (and in particular fasting) are known to exacerbate migraine.[39] A promising recent randomized clinical trial demonstrated that a 12-month weight-loss program in adolescents with migraine was associated with decreases in migraine frequency, intensity, and disability; further reductions in body mass index were associated with migraine outcomes.[40] More research should examine the impact of weight-loss interventions on migraine.

PERSONALITY TRAITS AND MIGRAINE

There have been numerous hypotheses concerning the role of personality traits that may predispose to headache or be characteristic of people with migraine. Harold Wolff developed the notion of "the migraine personality," depicting people with migraine as rigid, conscientious, meticulous, perfectionistic, and obsessive.[11] This early literature had a significant selection bias, as it was based on non-standardized assessment and cross-sectional designs that did not distinguish between causes and effects of migraine. These early studies also did not control for headache frequency, substance use, psychiatric comorbidity, or disability. Later epidemiological studies found a moderate relationship between migraine and the personality trait of neuroticism, or susceptibility to experience negative affect, in both clinic- and population-based studies.[41–43] This higher level of neuroticism remained after controlling for comorbid anxiety and depression.[43] However, many psychological questionnaires with temporal qualifiers that reflect general health concerns, fatigue, social withdrawal, and generalized distress could result in inflated neuroticism scale scores because the headache disorder itself could produce this symptomatology. Therefore, it is possible that differences in neuroticism scale scores on personality questionnaires may reflect frequency of head pain as well as related somatic issues rather than a stable personality trait. Later studies showed that neuroticism seems to be unrelated to headache frequency, intensity, or duration,[44,45] except for one study with women with migraine where there was a strong positive correlation between headache duration and neuroticism.[46]

Neuroticism is the personality trait that has been most consistently associated with migraine. Harm avoidance shares some properties with neuroticism, and is characterized by behavioral inhibition, excessive fear and worry, introversion, and pessimism. Subjects with migraine endorsed higher levels of harm avoidance than non-migraine controls on the Temperament and Character Inventory.[47–50] These studies showed inconsistent results on the traits of self-directness and persistence. Catastrophizing is a construct where individuals show an exaggerated appraisal of the negative consequences of pain, often exhibiting magnification, rumination, and helplessness. Holroyd and colleagues have showed that this psychological response to migraine is associated with impaired functioning and poor quality of life – independent of migraine characteristics and comorbid psychopathology.[51]

The Minnesota Multiphasic Personality Inventory (MMPI) is the most widely used personality questionnaire and instrument to measure adult psychopathology. Several MMPI studies have shown that chronic migraine and chronic tension-type headache, with and without medication overuse, have significant elevations on the hypochondriasis, depression, and hysteria scales (neurotic triad), as well as social introversion, as compared with episodic migraine. The frequency of headache seems to be more indicative of "personality traits" than is the actual headache diagnosis.[52–55] A recent Italian study showed that patients experiencing chronic daily headache with psychiatric comorbidity had significantly higher MMPI-2 scores (than chronic daily headache patients without psychiatric comorbidity) on all scales of the neurotic triad. Medication overuse was not a significant factor.[56] Galli and associates have shown that medication overuse headache (MOH) patients and pure substance abusers do not share dependency characteristics on the MMPI-2.[57] There may be two separate profiles in medication overuse headache patients with a more complex group exhibiting significant dependency features and who are more likely to abuse opioid analgesics.[58,59]

PSYCHIATRIC COMORBIDITY

Comorbidity is the presence of any additional coexisting disorder in an individual with a particular index

disease; a more than coincidental association between two conditions. A variety of reviews have shown a significant relationship between migraine and psychiatric disorders.[60–62] Psychiatric comorbidities may complicate differential diagnosis; increase medical costs; affect adherence to treatment regimens; impact quality of life; contribute to increased headache-related disability; and impact the course of migraine, in some cases leading to headache chronification.[63–68]

In population studies, subjects with migraine are between 2.2 and 4.0 times more likely to suffer from major depressive disorder (MDD) than people without migraine.[61,69,70] A bidirectional relationship has been consistently demonstrated between migraine and major depression, in longitudinal studies, with either disorder increasing the risk for the other, suggesting a possible shared neurobiology.[70] Potential mechanisms underlying this comorbidity remain largely unexplored, and include serotonergic and other neurotransmitter dysfunction; dysregulation of the HPA axis; proinflammatory cytokines; central sensitization processes; and fluctuations in ovarian hormones.[71] Two population-based studies found an overall prevalence of MDD of 28% in the migraine sample, and only 12% in two other chronic pain states.[72,73] There is about a 2.5- to 3-fold higher relationship between migraine and bipolar spectrum disorders.[74–78] Bipolar spectrum disorder, MDD, recurrent depression, and suicide attempts exhibit a stronger relationship for migraine with aura than for migraine without aura.[75–80] Chronic migraine has higher associated depression than episodic migraine,[81–84] and there is also an increased prevalence in MOH, with the psychiatric disorder often preceding the medication overuse.[85,86]

The lifetime prevalence of anxiety disorders in people with migraine (ranging from 51% to 58%) is almost twice that of MDD.[82,87] Anxiety disorders may complicate migraine more than depression, with greater long-term persistence, greater headache-related disability, and reduced satisfaction with acute therapies.[65,68,88] The onset of anxiety generally precedes the onset of episodic migraine, whereas the onset of major depression follows the onset of migraine.[76,89] Anxiety may appear in childhood, followed by episodic migraine then depression, and then transformation to chronic migraine. Compared with individuals without migraine, individuals with migraine have about a four- to five-fold greater risk for generalized anxiety disorder, five-fold greater risk for obsessive-compulsive disorder, and approximately 3.75-fold greater risk for panic disorder.[61,66,72,75,76,90–92] A stronger relationship is noted between panic disorder and transformed and chronic migraine, with lifetime prevalence between 25% and 30%.[83,91] Panic disorder is also more common in migraine with aura[92] and, similar to the depression data, has a bidirectional relationship with migraine.[93]

Childhood maltreatment, including physical, emotional, and sexual abuse, is associated with migraine. Headache clinic studies have shown 25–30% of migraine patients reporting a history of physical or sexual abuse. Headaches in individuals who suffered from childhood maltreatment tend to be more disabling, and more likely to "transform" from episodic to chronic variants.[94–96] A higher prevalence of post-traumatic stress disorder in migraine sufferers has been noted in general population surveys, tertiary-care headache clinic studies, and military surveys. In tertiary care centers, approximately 22–30% of headache sufferers meet post-traumatic stress disorder diagnostic criteria.[97,98] Approximately 25% of the patients in an inpatient refractory daily headache population suffered from a personality disorder.[99] In one clinical study, a diagnosis of borderline personality disorder was associated with more pervasive headache, high headache-related disability, lower probability of responding to standard preventive pharmacological therapy, and greater risk for medication overuse.[100]

Although comorbid depression and anxiety are associated with poorer functioning and quality of life in people with migraine,[71,92] individuals with migraine and comorbid depression and/or anxiety can experience significant improvement in migraine over the course of comprehensive treatment.[101] Behavioral/psychological treatments for migraine as well as anxiety and depression share similar goals. Psychological treatments for depression focus on changing behaviors, cognitive patterns, and social interactions that may be conducive to the development of depression.[102,103] Psychological treatments for migraine as well as depression-specific psychotherapies attempt to increase self-efficacy. Patients learn ways to better regulate their pain and mood state while increasing their functionality and problem-solving skills. Many headache patients who have comorbid depression tend to be helpless, hopeless, discouraged, and nonadherent to headache treatment recommendations. In both migraine and mood disorders, it is important to maintain consistent biological rhythms, activate behavior, modify self-defeating thinking, and develop better coping skills.

Headache patients with comorbid anxiety also pose significant treatment challenges. Anxiety disorders are typically accompanied by fear-based thoughts of danger and vulnerability. Avoidance of feared stimuli reduces discomfort but maintains the danger belief that the fear stimuli and anxiety symptoms themselves are harmful.[103] Patients with anxiety disorders tend to overestimate the likelihood of the occurrence of a negative event, such as migraine, and perceive situations as more catastrophic, threatening, and unmanageable than the objective reality.

Panic disorder is a chronic condition similar to migraine, with episodic attacks of high impairment and interictal worry of future attacks. Headache patients with anxiety disorders often develop conditioned anticipatory fear of somatic sensations that are perceived as "warning signals" of unpredictable severe pain that is similar to interoceptive panic conditioning.[92,104] Patients may treat fear or what they think is a migraine prodrome with medication, believing that they will pre-emptively avoid migraine. Medication reduces their emotional distress and "prevents" the migraine – a powerful avoidance learning condition process. Many migraine patients, similar to panic disorder sufferers, are exquisitely sensitive to bodily signals and have high anxiety sensitivity in which they fear benign anxiety-related physical sensations because they believe that they will have catastrophic consequences.[92,105] Patients may become exquisitely sensitive to perceived headache triggers. It is helpful when treating those headache patients with significant anxiety to provide opportunities for exposure to feared somatic symptoms (interoceptive exposure) so that they can challenge their danger cognitions and negative predictions about these internal sensations. Patients learn to better tolerate migraine prodromes, limit any avoidance responses, and make rational therapy decisions.

PSYCHOLOGICAL FACTORS IN MEDICAL TREATMENT OF HEADACHE DISORDERS

Medication Adherence

At the most basic level, medications are only effective if patients take them. However, particularly for headache medication, simply "taking" a medication is insufficient knowledge as to whether a patient is taking that medication *optimally*. Medication adherence refers to the extent to which a patient engages in the medication-taking behaviors required to optimally manage headaches.[106] For headaches, medication adherence can take place in a preventive manner (on a fixed schedule) and in an acute manner (in the context of a headache episode).

Keeping medication on hand is essential to adherence with both preventive and acute headache medication. However, barriers to having a medication on hand when needed do occur. For preventive medication, individuals with headache may experience difficulty in remembering to take their medication, or may have low motivation to take their medication, if they are not currently experiencing a headache. With acute medication, patients with headache describe difficulty keeping medication with them at all times, particularly when their schedule is disrupted (which is also when a headache is most likely to occur).[8] Further, some headache sufferers do not have medication on hand because they did not refill their prescription. For example, one pharmacy utilization study in Israel ($n = 1498$) found that over half of the participants (56.1%) purchased triptans only once within a 6- to 18-month period.[107]

Adherence to preventive therapy, beyond filling prescriptions and having medication on hand, requires incorporating taking the preventive medication into the patient's daily routine. Across chronic diseases, only 50–75% of patients consistently use medication prescribed on a fixed schedule.[108] Adherence to taking medications on a fixed schedule is associated with less complex medication regimens, fewer daily doses, oral rather than other routes of administration, lower risk of side effects, and higher perceived need for the medication.

Medication adherence with acute headache medications, or medications taken on an as-needed basis to treat acute headache attacks, requires a complex, iterative decision-making process based on dynamic headache symptoms and circumstantial demands.[109] Patients and providers have described a series of interdependent behaviors required for optimal use of acute medication, including distinguishing between headache types, choosing what type of medication to take, taking medication early, repeating doses as needed, and limiting overuse of acute headache medication.[8] Further, multiple steps of individually tailoring the acute headache medication regimen is common in clinical practice.[11] Thus, the "rules" regarding optimal use of acute headache medication are likely to change over the course of treatment, which can be cognitively demanding for the person with headache to remember during a painful headache episode.

During a migraine episode, using a migraine-specific medication initially is often associated with better outcomes.[110,111] However, many patients do not use a migraine-specific medication initially but instead rely on non-specific pain medications.[112] Further, between 40% and 85% of individuals with headache often wait to take acute medication (especially migraine-specific medication) until the headache is moderate or severe, rather than taking the medication earlier when the pain is mild (which is associated with better treatment outcomes).[111,113,114] Patients describe concerns about side effects and perceived dangerousness of prescription (as opposed to over-the-counter) medication as contributing to this delay. However, patients also describe difficulty identifying an acute headache as a migraine (as opposed to a tension-type headache) early during the course of the headache.[8] Patients also may wait to take migraine-specific medication as a strategy to prevent

overuse of acute headache medication, or because they have a limited supply.

Headache sufferers taking acute medications must be particularly careful to avoid medication overuse headaches. Medication overuse headache refers to the phenomenon of headaches actually increasing in frequency and severity when acute headache medications are taken frequently. Therefore, it is generally recommended that headache sufferers use acute medications no more than 2 or 3 days per week to prevent medication overuse headache.[10] Estimates suggest that at least 4% of patients, with headache overall, fail to limit their use of acute headache medications, placing them at high risk for medication overuse headache.[115,116] This phenomenon is significantly more common in tertiary care.[117]

Comprehensive multidisciplinary treatments for primary headaches, as well as medication overuse headache, commonly incorporate education and motivation enhancement strategies to bolster acute medication adherence.[118] Brief targeted educational and motivation enhancement strategies alone, such as nurse education or between-visit motivational phone calls, have also demonstrated some efficacy to modify specific acute medication adherence behaviors (e.g., taking medication early, or reducing medication overuse).[113,119]

Several steps can be taken to increase medication adherence in patients with headaches.[118] Specifically, assessing how individuals with headache take their medications can provide valuable information for the clinical assessment, and allow for targeted interventions. Involving the patient in treatment planning can ensure that the medication regimen recommended is realistic and aligns with patient goals for treatment. Reducing the complexity of the treatment regimen is an important first step in improving adherence to both preventive and acute medications. Consistent education across providers tailored to the individual patient's problems with medication adherence is essential, and retention can be enhanced by providing written materials at an appropriate literacy level. Additionally, incorporating family members or other significant individuals in the patient's life can be useful to support medication adherence.

Motivation to take headache medications may vary with episodic exacerbations of headache symptoms; therefore, motivation enhancement strategies are warranted. These strategies may include linking medication adherence to desired goals in the patient's life, and developing specific and realistic plans for implementing changes in medication. Providers should consider strategies that are appropriate to a patient's level of readiness to change. For example, if a patient is unaware that medication overuse is causing problems in his or her life, non-judgmental education strategies may be beneficial. However, if a patient is well aware of the negative consequences of medication overuse and has a strong desire to reduce medication use, strategies to build patient self-efficacy and provide specific realistic goals would be warranted. Reinforcing successful medication adherence can enhance motivation.

Patient–Physician Communication

Perceived empathy from one's physician has been associated with adherence with behavioral and pharmacological treatment recommendations and a decrease in migraine disability and symptoms over 3 months.[120] Both patients and physicians identified high quality communication in the patient–physician relationship to be a key factor in adherence with acute headache medications.[8] However, both patients and physicians have idiosyncratic assumptions when entering a new encounter. These assumptions can color interpretation of communication, and can leave both parties with an incomplete or inaccurate representation of what the other was attempting to convey. Patients and physicians often have differing impressions of number of migraine days and disability due to headache[121] as well as aberrant medication-taking.[122]

Patient–physician communication can be improved through several measures. The first is through standardizing methods of gaining information regarding headache. Utilization of surveys about headache symptoms and quality of life (such as the Migraine Disability Assessment or MIDAS),[123] and standard headache diaries,[124] can provide a starting point for conversations about migraine symptoms and improve communication about migraine.[124,125] The second method is through improving communication techniques to enhance understanding between the physician and patient.[126] One useful technique is the "ask–tell–ask" method of communication, which involves asking an open-ended question, relaying in simple terms information pertinent to the patient's treatment, and then, to ensure understanding, requesting that the patient rephrase what was just communicated. The American Migraine Communication Study II demonstrated that training physicians in using open-ended questions and the "ask–tell–ask" method of relaying treatment information can be effective in improving communication.[127]

PSYCHOLOGICAL APPROACHES TO TREATING HEADACHE DISORDERS

Non-pharmacological approaches to treating headache disorders are appropriate for a wide range of patients, including patients who are pregnant or

planning to become pregnant, patients for whom medications are contraindicated, patients who have not responded adequately to pharmacological interventions, and patients who prefer not to take medications. Relaxation training, biofeedback training, and cognitive behavioral therapy have a robust evidence base, and are recommended in treatment guidelines for both migraine[128] and tension-type headache.[129] These treatments can be combined with each other for effective management of migraine[24] and chronic tension-type headache.[25]

Biofeedback and Relaxation-Based Therapies

Biofeedback refers to any treatment in which biological processes (most often those associated with sympathetic arousal) are brought to the awareness of the patient.[130] This awareness gives patients enhanced understanding about the factors that contribute to changes in their bodies, and, with training, can provide an opportunity to increase the patient's control over these processes.[131] The physiological feedback is often paired with training in methods of relaxation. Considerable evidence from randomized clinical trials exists to support the efficacy of biofeedback to treat migraine and tension-type headache, with estimates of improvement in headache of between 35% and 60%.[132,133]

The purpose of biofeedback is to assist patients in learning to control their autonomic nervous system, which, in people with headache, is typically overexcitable. In a biofeedback session patients are presented with computerized feedback, typically an audible tone or visual indicator, about physiological responses (e.g., peripheral skin temperature, muscle tension, heart rate variability) not typically under the patient's voluntary control. Recent research suggests that the main benefit of biofeedback is to help patients learn how psychological factors impact their bodies in demonstrable ways. Thus, biofeedback appears to impact headaches through increasing a sense of self-efficacy in managing headaches, as well as through any physiological changes.[132,134,135] For example, a patient may relate a story about a work-related stressor that occurred during the past week, along with a relaxing evening spent with a friend, and then notice the changes in physiological responses between these two stories. Patients are encouraged to experiment with different thoughts and techniques to modify those responses. Although we recommend doing biofeedback with a trained behavioral healthcare professional when possible, a resource for biofeedback can be found at the HeadacheCareCenter™ website (www.headachecare.com/biofeedback.html).

Relaxation training refers to the utilization of cognitive and behavioral techniques to voluntarily reduce sympathetic arousal in-the-moment. In headache patients, common relaxation techniques include diaphragmatic breathing, progressive muscle relaxation, autogenic training, and imagery/visualization.[136,137] Diaphragmatic breathing involves engaging diaphragm muscles in taking slow, measured breaths, and is occasionally combined with counting during in-breaths and out-breaths. Progressive muscle relaxation is a technique, initially developed by Edmund Jacobson in the 1930s, designed to teach individuals to discriminate between tense and relaxed muscles, with the intent of inducing physiological relaxation.[138] As patients improve their skills they may be able to combine muscle groups, or forego the muscle tension component altogether (which is termed "body scanning"). Autogenic training refers to imagining one's limbs as warm and/or heavy, and is commonly paired with hand-warming biofeedback. Imagery/visualization involves creating a rich, immersive environment in one's mind, and allowing all five senses to absorb and interact with this environment. Relaxation techniques can be utilized in short and long versions, and can be combined for maximum effectiveness in an individual patient. Relaxation techniques are often paired with biofeedback, which provides a rationale for their use, and individualized feedback to observe the efficacy of various relaxation techniques.[136,139]

Biofeedback and relaxation strategies are typically taught in sessions with clinicians, but the primary emphasis of the treatment is consistent home practice of the skill, to be utilized both in a daily manner to prevent headaches and in an acute manner during a headache to increase coping.[140] Biofeedback and relaxation training teach skills that individuals with headache can continue to utilize on a regular basis, with benefits that extend beyond the treatment period.[130]

Cognitive Behavioral Approaches

For headache disorders, cognitive behavioral therapy (CBT) attempts to modify both thinking and behavior patterns to improve quality of life.[137,141,142] Behavioral components typically include keeping a diary of headache symptoms and potentially relevant behaviors (such as medication adherence, sleep, stress, and diet); setting goals to modify these behaviors; and utilization of the relaxation and biofeedback techniques discussed above. Cognitive components include improving a sense of self-efficacy to manage headaches, and identifying and challenging maladaptive thought patterns. Self-monitoring of cognitive factors by keeping a record of situations, thoughts, and

emotions that co-occur with headaches is necessary to identify maladaptive thought patterns.[143] A common maladaptive thought pattern in migraine is catastrophizing, or focusing on and expecting the worst possible outcome of a situation. Catastrophizing has been associated with higher headache-related disability,[144] and can be reduced effectively with CBT for headache.[142]

Cognitive behavioral therapy for migraine is considered to have Grade A evidence, based on findings from randomized clinical trials.[128] In one trial, CBT reduced headache activity by an average of 68%, compared with 56% for biofeedback and 20% in the control group.[145] A recent trial demonstrated that a 10-session CBT protocol reduced migraine symptoms and migraine-related disability in children with chronic migraine compared with 10 sessions of headache education.[146] Further evidence suggests that the combination of CBT and preventive drug therapy for headaches may be more effective than either treatment alone. In a trial of a minimal contact CBT for severe migraine (comprising four monthly sessions with a workbook and between-session phone calls), the combination of preventive drug treatment was more effective in reducing migraine frequency and migraine-related disability compared with CBT alone, preventive medication alone, or placebo.[24] In another trial of minimum contact CBT for chronic tension-type headache (three monthly sessions with a workbook and between-session phone calls), a combination of CBT and a preventive medication was more likely to produce clinically significant (larger than 50%) reductions in headache index than CBT alone, preventive medication alone, or placebo.[25]

CBT is time- and cost-effective compared with pharmacological preventive treatments.[147] It can be successfully delivered at home or with minimal therapist contact through technology-augmented interventions such as the telephone or Internet, and can be tailored to meet the needs of individual persons with headache.[24,148,149] Although CBT has demonstrated efficacy, a large proportion of participants in trials (roughly 40%) may not experience clinically significant reductions in migraine symptoms.[150] However, CBT may have greater effects on other factors related to quality of life, including functional and social disability, psychiatric symptoms (depression and anxiety), and adaptive thoughts and beliefs (e.g., self-efficacy).[151] For example, a small trial examining 10-week CBT for headache and focused on reducing catastrophizing ($n = 34$) did not find differences between changes in headache frequency and intensity compared with a wait-list control ($n = 11$); however, the CBT group reported significantly greater reductions in headache-related catastrophizing and anxiety, and increases in self-efficacy to manage headaches.[142] Thus, CBT may be useful in improving quality of life in individuals with headaches, even for the proportion of those who do not experience clinically significant reductions in headache symptoms.

CONCLUSION

Understanding the influence of psychological factors on a patient's headache presentation can improve quality of care and, in turn, the patient's quality of life. Modification of psychological factors to improve quality of life can occur within the clinic visits with the physician, or through treatments provided by psychologists and other behavioral healthcare providers. Healthcare providers can educate patients to normalize known headache triggers, particularly stress, sleep, and diet, which can help patients gain control over headache onset, exacerbation, and chronification. For patients experiencing difficulty managing these triggers, a course of behavioral treatment to address such triggers (e.g., cognitive behavioral therapy to normalize sleep or to decrease stress) may be warranted. Treatment of psychiatric comorbidities of headache disorders, most commonly depression and anxiety disorders, can also improve the quality of life of patients with headaches. Psychological interventions can also improve the care of headache patients through improving medication adherence and communication with providers. Psychological treatments, including relaxation, biofeedback, and cognitive behavioral therapies, have demonstrated efficacy for the treatment of headache disorders. Referral to psychologists and other behavioral healthcare providers trained in these interventions can improve the care of many patients with headaches.

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