Psychological Factors in Childhood Headaches

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In children and adolescents, migraine headaches may be precipitated by psychological factors, may be exacerbated by psychosocial or environmental stressors, and may adversely impact the quality of life of both the child and the family. Migraines also may respond to therapeutic psychological interventions. In this article, we use 2 case reports to show the effect of psychological factors on both the causation and treatment of migraine in children and adolescents.

Case 1

Eric is a 10-year-old white male in the fifth grade. Since he was 5, he had on average 1 migraine a year that usually occurred during the summer when he was overheated while playing hard with his friends. The headache was treated with acetaminophen, but over the past 3 months, migraines have been occurring 2, 3, or 4 times a week.

His mother reported that her husband lost his job 6 months ago, and she had taken on 2 jobs to support the family. Even though he is trying desperately to find work, there seems to be nothing for him. After his mother left the room, Eric volunteered that the family has had to move to a rental home, placing him in a different school. Being new to the classroom, he has been bullied but has said nothing to his parents because “They have enough to worry about.”

Even though the psychological factors are obvious in this case, at the core of Eric’s attempts to cope with problems is his biology. As an infant, he was colicky; as a toddler, he displayed “migrainous equivalents,” such as being a light sleeper and having motion sickness, episodic abdominal pain, and intermittent vertigo. His genetically vigilant nervous system interacted with specific psychosocial and environmental factors or triggers to produce migraines. Over time and as the migraines progressed, biological, psychological, and social consequences occurred that interfered with his functioning optimally at home and school.

When pain is recognized as a mind-body-spirit response, dissecting the psychological from the other aspects is like cutting into a worm to discover how it functions. By eliciting and listening to the child’s understanding of headaches, clues are revealed that point to possible resolutions. In Eric’s case, he wants to know how to handle the bully at school; how to tell his parents that he too is taking on some of the responsibility for family turmoil; and, most importantly, what can he do about these headaches that are defeating him worse than the bully. Because migraine is a chronic disorder, teaching Eric coping skills to deal with a hyperexcitable brain is a tool for health that lasts a lifetime.

School Absences and Secondary Gain

Eric’s parents see him in pain and want to keep him home to nurse and protect him. Yet, at the same time, they are afraid that headaches are being used as an excuse to get out of something he does not want to do. There are 3 questions to
measure the influence of psychological factors in missing school because of headaches: (1) Are headaches a way to avoid school? (2) Is the child a perfectionistic? and (3) Was there a perceived trauma that occurred when the frequency of the headaches increased?

**Are Headaches a Way to Avoid School?**
Yes, Eric would be able to escape from the bully. Instead, he needs to learn how to deal with the bully by standing up to him with friends. For Eric, staying in school is essential.

**Is the Child a Perfectionistic?**
No, Eric is not a perfectionistic in school, but with a very sensitive nervous system, he is attuned to the expectations of parents, siblings, and others close to them. He takes on the responsibility of avoiding conflict before it occurs. With antenna picking up possible clues to unrest, he may become a perfectionistic on the way to making his parents and others happy with his performance. He expects to be liked by everyone, as well as involved with many extracurricular activities. In the process, the child’s nervous system becomes overwhelmed under the stress of being unable to achieve the impossible.

**Coping Skill: “I Forgive Myself for Being Imperfect”**
Eric needs to understand that being human means being imperfect. It is alright to be imperfect, and mistakes are effective ways to learn. Eric’s focus needs to shift from what others expect to what he wants.

**Was There a Trauma That Occurred Simultaneously With the Increased Frequency of Headaches?**
Yes, Eric’s family structure and interaction has changed drastically since his father lost his job.

**Coping Skill: Set Realistic Expectations for Self**
Eric needs to become aware of his desire to take over for his father and solve the family crisis. As a 10-year old, he cannot rescue his parents, but he can help ease the chaos in the household by once again becoming wrapped up in sports and friends.

**Divorce**
When a family appears to be falling apart and emotions are frayed, children cannot help but worry about their parents’ divorcing. Children may absorb the tension, believing they are being punished for misbehavior, and they cling or push away. A child may attempt to parent the parents, modeling the art of sharing and getting along, or he/she may transform into a hellion on wheels, destroying everything in his/her wake, including the rift between Mom and Dad.

The distress children feel can also be physical. This may be expressed as stomach aches and nightmares. Under such stress, the genetic predisposition to migraines may erupt into a first or more frequent attacks. In fact, a child often becomes the designated patient in the hope of holding the family together by diverting attention to his/her health instead of the disintegrating relationship between parents.

**Somatizing Stress**
Physical pain is easier to express than emotional pain. Physical pain is tangible, diagnosable, and understandable. People feel sorry for a person in pain and reach out to soothe the hurt. In the process, the person receives special attention and treatment, and it can alter family dynamics. Especially when rest is the best medicine, dependency becomes fostered. However, the longer the physical problem continues, the more it becomes a component of the person as well as the family interaction. Eventually, it becomes a monkey on everyone’s back. Even though it is unwanted, overtime pain becomes a familiar companion.

The need to be needed can be seductive to the parent who feels wronged, betrayed, or abandoned by the divorce. This can lead to the development of a codependent relationship between child and parent in which the child’s pain or illness brings the parent closer. Codependency, which is automatic and unconscious, convinces the child and the parent that they are doing the best they can, but, in reality, when the child feels healthy, the parent’s role as caregiver diminishes, leading to a sense of being unwanted. This may result in a long-term codependent enmeshment between parent and child.

**Coping Skill: Express Feelings**
The pain of headaches needs to be associated in the child’s mind with the pain of a possible divorce. By encouraging the child to identify and express feelings, the child sees that the headache is an expression of his distress over the fear that the family is breaking up. Tapping into the emotional pain helps temper the physical pain.

**The Helper**
As a migraineur, the child is highly sensitive to the feelings of the family and may attempt to protect a parent by intercepting the barbs thrown by the other parent. He/she aims to keep his/her parents happy by doing everything right so they have less to worry about. He/she has a hard time sleeping, worrying that he/she is shirking his/her duty by being in his/her own bed rather than looking after his/her parents. He/she has bad dreams about his/her home teetering on the edge of a mountain, being swept around by a mud slide while he/she stands by watching unable to rescue his parents inside. Trying to outparent his/her parents may trigger or exacerbate headaches.

**Coping Skill: Play Everyday**
Give the child permission to be a kid. The message should be the following: “You can’t fix this. Your parents need to work things out. Your job is to enjoy childhood.”

**Acting Out Fear**
To every request, this child has the same response, “No! You can’t make me!” He/she fights on the playground during recess. He/she is sent to the principal’s office for talking back to
Comorbidity: Migraine and Psychopathology

Do children and adolescents with migraines have an increased prevalence of depression, anxiety, or other psychiatric conditions? If psychological stressors are major contributors to the precipitation of migraine, does it follow that the child or adolescent with migraines is more likely to have an emotional problems than other children?

Comorbidity is the occurrence of 2 separate disorders in 1 patient. Both disorders may be caused by a common environmental or genetic risk factor, or 1 disorder may cause the second. There is substantial information on the comorbidity of migraine and depression, bipolar disorder, and anxiety disorders in adults, including studies that have used International Headache Society (IHS) criteria for migraine and well-accepted measures of psychopathology. Breslau et al have shown that there is a bidirectional association between depression and migraine. The presence of depression at baseline increases the risk for developing migraines, and migraines are associated with an increased risk of developing depression. Breslau also found that patients with migraine with aura and comorbid depression had a greater risk of suicide attempt or ideation than patients with either migraines or depression. In contrast, there was no increased risk of suicide attempt or ideation in patients with migraine without an aura. Although the association was not as strong as seen between depression and migraines, Breslau et al have found an association of panic disorder and both migraine and severe headaches.

Epidemiologic Surveys in Children and Adolescents

In contrast to the data on adults, there is less information on the association between childhood and adolescent migraines and depression or anxiety. Four epidemiologic studies have shown an association between headaches and psychopathology in children and adolescents. These studies did not use IHS criteria for headache diagnosis. Pine et al completed an epidemiologic assessment of 776 youths 9 to 18 years of age. Psychopathology was diagnosed with structured interviews, and youths were asked if they had a history of migraines or chronic headaches preventing usual functioning. They found an association between depression and incapacitating headaches. Depression predicted later development of headaches, but headaches did not predict subsequent depression. After controlling for depression, there was no association between headache and anxiety disorders.

Aromaa et al noted that symptoms of depression and sleep disruption present at 3 years of age predicted headaches at 6 years of age. Egger et al used prospective epidemiologic data from the Great Smoky Mountains Study and found an association between headaches and both depression and anxiety in girls but not boys. Girls with depression had 4 times higher prevalence of headaches than girls without depression and girls with anxiety had 3 times higher prevalence of headaches than girls without anxiety. There was an association between conduct disorder and headaches in boys. Boys with conduct disorder had twice the prevalence of headaches compared with boys without conduct disorder. Strine et al showed an association between frequent or severe headaches and emotional, conduct, inattention-hyperactivity, and peer.
problems as measured by the Strengths and Difficulties Questionnaire. Children with headaches were 3.2 times more likely to have behavioral or emotional problems than children without headaches.

Two recent studies of comorbidity in children and adolescents have used IHS criteria for migraine and validated measures of psychopathology. Anttila et al\(^{20}\) used the Child Behavior Checklist for the diagnosis of psychopathology and IHS criteria for headache diagnosis. They found that children in the sixth grade who experienced migraines had more total, internalizing, and somatic symptoms than children without headaches. Internalizing scores above the cutoff were found in 28.8% of children with headaches compared with 8.8% of children without headaches. Wang et al\(^{21}\) described the association between migraine and depression and suicidal ideation in adolescents 13 to 15 years of age. Suicidal ideation was more common in those with a migraine with aura. After controlling for depression, there was still an association between suicidal ideation and migraine with aura and high headache frequency but not migraines without aura or probable migraine.

**Clinical Studies of Migraine and Psychopathology in Children and Adolescents**

Clinical studies have helped define the emotional and behavioral comorbidities of migraine. Cooper et al\(^{22}\) found no difference between children 6 to 16 years of age with migraines and controls on measures of anxiety or stressful life events. They did find that the children with migraines who had more symptoms of anxiety experienced more frequent and severe migraines. Pakalnis et al\(^{23}\) studied 47 children 6 to 17 years of age with migraines and 30 controls. There was no statistically significant difference in the prevalence of depression or anxiety, but the children with migraines had more symptoms of oppositional defiant disorder. They found that the scores on their measure of anxiety were higher in children with migraines than controls.

Heng and Wirrell\(^{24}\) compared sleep and behavioral measures in children with migraine with siblings without migraines. The children with migraines had elevated internalizing scores compared with siblings, but no difference on the anxiety and depression subscales. Children with migraines had more total sleep problems, sleep delay, and daytime sleepiness than siblings, and the sleep problems were associated with more behavioral problems.

In summary, the association between migraines and emotional or behavioral problems is stronger in adults, suggesting possible developmental differences. Children and adolescents with migraines may have certain symptoms suggestive of depression or anxiety without being diagnosable as disorders of mood or anxiety. However, when symptoms are present, mood and anxiety problems may contribute to the severity and frequency of migraines in children and adolescents. Clinicians should explore the relationship between environmental and emotional stresses and the onset of migraine attacks in children and adolescents.

**Psychological Interventions to Treat Migraine**

**Case 2**

**Pain Symptoms**

Sam is a 14-year-old girl with prominent headaches that have occurred daily for the last 2 months. She describes bilateral pain most days, but there are times when she has unilateral pain with no clear predominance of location for pain. She indicates that her headaches feel as though someone is tightening a band around her forehead and squeezing it, creating a throbbing sensation. Each daily headache follows a fairly steady course. She wakes up each morning with pain that abates during the early afternoon immediately after lunch, but during the late afternoon and early evening, there is a steady increase in pain intensity. She frequently has photophobia but no phonophobia and some nausea but no vomiting. Her sleep onset is delayed by up to 1.5 hours secondary to her pain. She suffers from middle insomnia twice a week when she awakens to a feeling of tension within her head. Although she has not been diagnosed with temporomandibular joint disorder (TMJ), she has a history of teeth grinding at night, which predated the onset of her headaches. Medical workup, including magnetic resonance imaging of her head, revealed nothing remarkable. She has not started her menstrual period and denied any significant medical problems with the exception of occasional sinus problems and asthma. Indeed, her only other history of headaches was a 2-week bout of daily headaches during a sinus infection. Once antibiotics were initiated, the headaches stopped.

**Disability**

Sam missed approximately 15 days of school her fall semester compared with no absences the previous school year while in elementary school. She believes she has lost some friends because she does not feel well enough to go to the movies, hang out with friends, or join in extracurricular activities that she enjoyed in elementary school. She believes she has lost some friends because she does not feel well enough to go to the movies, hang out with friends, or join in extracurricular activities that she enjoyed in elementary school. She is rarely physically active now and has gained 20 lb since the end of last school year.

**Mood Symptoms/Emotional Regulation**

Samantha was diagnosed with attention-deficit hyperactivity disorder 3 years ago and started taking stimulant medications. After several trials of different medications, she now uses the Daytrana patch (Noven Pharmaceuticals, Inc., Miami, FL) with good relief. Further complicating her symptomatology was a comorbid oppositional defiant disorder making self-regulation of emotion difficult. Compounding the difficulty with concentration brought on by the attention-deficit hyperactivity disorder, Samantha complains of poor concentration on days when her headaches are more severe. Anxiety has been a part of her life for sometime but never as prominently as now.
Her failing health and the recent death of a grandmother as well as several close family members have made her cognizant of the brevity of life. Even though angry outbursts have subsided, Sam now suffers from tearful bouts and anxious ruminations, not previously seen from her. A welcome change has also been her mild anxiety related to fear of getting into trouble at school. She also fears getting sick and is afraid that her mother too may become ill. Because self-regulation of emotion and behavior play important roles in controlling anger, anxiety, and pain, they will likely be essential issues to address in her treatment plan.

**Psychosocial Stressors**

She has experienced multiple stressors within the last year contributing to her daily headaches. About 6 months ago, a neighbor boy bullied her, and now he and his friends tease and verbally harass her at home and during daily bus rides to school. Moving from elementary school to the sixth grade academy has proven a disappointment academically and socially. She was set to have her “best year yet” but because of the teasing, the headaches, and continual trouble completing work in a timely fashion, she has found school to be significantly challenging and a constant source of stress.

**Formulation/Conceptualization**

Anxiety and depression may be comorbid with disabling headaches in children and adolescents. Samantha meets the criteria for generalized anxiety disorder and attention-deficit hyperactivity disorder along with oppositional defiant disorder. Additionally, she would also qualify for a pain disorder with both medical as well as psychological characteristics. Because of her anxiety, she is likely to focus her attention on her pain and somatic complaints yet may not use approach coping strategies (orient to threat but then use avoidance coping strategies to deal with it). This lack of coping puts her at risk for continued anxiety, social isolation, and later depression. Screening for these disorders along with timely referrals to mental health professionals is often necessary.

**Treatment**

Psychological interventions for Samantha could include a combination of cognitive behavioral therapy (CBT), biofeedback, problem-solving skills, and intervention with school to ensure that she is provided with adequate accommodations.

**School Intervention**

Samantha, like other children and adolescents with frequent headaches, consider school as significantly stressful. Because children have headaches at school, coordination with school personnel is often vital. Ideally, the child will have either an individual education plan under the Individuals with Disabilities Education Improvement Act of 2004 or a 504 Plan under the Rehabilitation Act of 1973. These are services in which children can be provided accommodations to aid in their learning despite having a chronic illness. These could include the use of a quiet room like a nurse’s office to use biofeedback or relaxation techniques, go to the office to take medications, or have additional time for tests/assignments when having a headache. Careful consideration should be given to communicate expectations of school attendance, work performance while having a headache, and what the child is expected to do with a headache while at school. Getting child agreement of this plan is essential. Ideally, a clear plan for medication administration, school attendance, and work performance will be shared across the home, clinic, and school environment.

**CBT**

The evidence for using CBT with children and adolescents is growing and includes 2 recent meta-analyses showing moderate to large effect sizes. There is also growing empiric support for providing cost-effective CBT interventions via the Internet, which could effectively reach those individuals far from specialty headache clinics.

The basic elements of CBT interventions for pain include education, relaxation training, reducing the impact of cognitive distortions, and behavioral changes. The goal is to use approach instead of avoidance coping strategies. Thorn’s stress-appraisal coping model of pain conceptualization is a good example of a comprehensive model specifically designed for pain populations. It conceptualizes stress as a judgment by an individual that the pain he/she is experiencing exceeds innate resources. If one makes a primary appraisal that pain threatens identity or survival, then anxiety about future pain increases. This severely limits activity levels, increases reluctance to take risks, and curtails social activities out of fear of exacerbating pain. This is particularly harmful if an individual misinterprets headache pain as a signal that there are larger medical problems looming despite negative medical workups. A second problematic appraisal made by individuals with pain is seeing pain as the cause for a loss in life or being flawed or damaged. For Samantha, pain is the cause of social and academic loss, making her vulnerable to depression. One goal in CBT is to help individuals become effective agents of change (internal locus of control) and interpret pain as a challenge to be overcome. This redefinition of “I’m a well person with pain” gives hope, direction, and self-confidence and frees the person from the misery of being sick or disabled.

Additional targets of intervention can be an individual’s belief about the cause of pain, level of control over the pain, catastrophizing thoughts about the future, negative self-statements about coping ability, and negative thoughts about interactions with others. High degrees of negativity, as seen in depressed individuals, can be highly demoralizing and lead to hopelessness and despair. Paradoxically, the first step in managing pain is to overcome this despair.

Biofeedback is essential for treatment in this case. The primary goals for using biofeedback include specific symptom relief and control, alleviation of anxiety, depression, and increased self-efficacy. Trautmann et al., in a recent meta-analysis, showed reductions in frequency, duration, and intensity of tension type and migraine headaches when children used biofeedback. Moderate to large effect sizes characterize these interventions for symptom relief, which lasted up to 17 months (longest longitudinal follow-up reported). Results also showed improvements in the overall quality of life through
reductions in anxiety and depression. The range of the number of sessions used was 4 to 10 sessions.

There is support for several different biofeedback modalities for migraines and tension headaches. The most common forms include thermal biofeedback in which an individual changes vasodilatations via relaxation. Surface electromyography (in comparison with invasive electromyography) helps individuals learn to relax chronically tense frontalis, occipital, or trapeziums muscles. Blood-volume pulse helps individuals change the blood perfusion and vasodilatation of blood vessels in the hands and the surface of the temporal region of the head. Although the adult literature shows some emerging evidence that blood-volume pulse may be slightly more efficacious than other modalities, especially when treating migraines, this has not been shown in children or adolescents.

### Combining Medication and Behavioral Treatments

Although many children and adolescents will respond to CBT, biofeedback, and psychosocial interventions, some may require additional pharmacotherapy. Pharmacologic therapy is covered elsewhere in this issue and will not be repeated here. Only minimal modifications need to be made in the pharmacologic treatment of migraine in the child with a psychiatric disorder. Nonsteroidal anti-inflammatory agents, acetaminophen, sumatriptan, and oral triptans have been used for the acute treatment of childhood and adolescent migraine. In general, these drugs can be used safely in children and adolescents with comorbid psychiatric conditions. Nonsteroidal anti-inflammatory drugs can cause an elevation of lithium serum levels. Although there is a theoretic concern about a serotonin syndrome if sumatriptan is combined with serotonin reuptake inhibitors, sumatriptan has been used by patients on serotonin reuptake inhibitors without adverse effect.

Antiepileptic drugs, antidepressants, antistaminines, calcium channel blockers, and antihypertensive medications have been used as preventive therapies for migraines. A recent practice parameter from the American Academy of Neurology and the Child Neurology Society concluded that there was good evidence for the effectiveness for flunarizine, a drug not currently available in the United States, and insufficient evidence for the other agents presently in use. For the child or adolescent with migraine and psychiatric comorbidity, the best option may be a combination of CBT and psychopharmacology. SSRIs may be effective for anxiety and depression but have not been effective for migraine prevention. Tricyclic antidepressants may help with migraine prevention and possibly anxiety but have been ineffective in the treatment of depression in children and adolescents. The data for the use of propranolol in migraine are contradictory. Propranolol may help with the physiological symptoms of anxiety but has minimal efficacy for reduction of emotional symptoms.

Several drugs that may help with migraine prevention should be used cautiously in children and adolescents with emotional and behavioral problems. Propranolol and cyproheptadine can result in symptoms of depression. Mood disturbance has been associated with topiramate and levetiracetam. Also, levetiracetam has caused irritability and aggression, whereas topiramate sometimes produces cognitive problems.

### Conclusions

Childhood headaches that become a medical problem disrupt families and create a dark cloud over the child’s life. Once the child’s headaches are recognized and validated as biological events in response to environmental stressors, family issues can be addressed. After secondary headaches are ruled out, the focus of successful treatment is the dynamics of the situation in which the child functions. Often, there is chaos instead of structure; there are many activities without free time, and there is a sense of urgency without sharing meals or highlights of the day. In most cases, brief biofeedback training for the child (3 or fewer sessions) and 1 or 2 cognitive behavioral consultations with the parents begin the lifelong process of managing migraine. The 2 case studies, Eric (age 10 years) and Samantha (age 14 years), represent the spectrum of childhood headaches. Eric’s headaches are transforming from episodic to chronic, but intervention began early enough to use biofeedback and OTCs, whereas Samantha has multiple problems that exacerbate headaches into a chronic pattern. She requires more intensive treatment psychologically and pharmacologically. She is an example of the value of preventing such chronicity in a child by screening for and managing migraine and emotional factors that affect the child’s health.

### References