

# Working Through a Migraine

## Addressing the Hidden Costs of Workplace Headaches

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### ABSTRACT

The financial and personal impact of migraines in the workplace is substantial. Effective management of workplace migraines includes screening, prevention, and effective treatment. Worksite screeners are available to detect the burden of undiagnosed migraine in the workplace. Decreasing the personal and financial impact of migraines in the workplace requires a variety of strategies predicated on collaborative efforts among workers, occupational health nurses, other providers, and management.

**M**igraine headaches substantially impact both employee productivity and company profit. Effective headache management at the worksite requires a variety of strategies predicated on collaboration among workers, occupational health nurses, other providers, and management. This article provides occupational health nurses with an overview of the direct and indirect costs of migraines, various strategies for screening and treating employees who experience migraines, and potential worksite interventions.

### THE FINANCIAL BURDEN OF MIGRAINES

#### *Direct Costs of Migraines*

Each year, more than 50 million lost workdays are attributed to pain. Migraine, the most common type of recurrent severe headache, affects at least 12% of the U.S. adult population, nearly 30 million people, and is a leading cause of employee absenteeism and lower productivity (Wenzel, Dortch, Cady, Lofland, & Diamond, 2004). Lofland reported that the annual burden of care is estimated to be as high as \$28.7 billion in direct and indirect health care costs (American Academy of Neurology

[AAN], 2007; Kuznar, 2007). Direct costs in this report were defined as dollars paid for health services (insurance benefits for health care, pharmacy, dental care, and mental health care) and workers' compensation benefits (Greenberg, Finkelstein, & Berndt, 1995). Migraine sufferers incur average direct costs (\$12.7 billion) of \$4,436 per employee annually, \$2,571 more than for employees who do not suffer from migraines. Direct health care costs were \$200,410 per 1,000 migraineurs. These costs were attributed to migraine-related physician visits, including primary care physicians, neurologists, and pain specialists. Outpatient care (\$6.2 billion) ranked as the number one direct cost contributor among employees with migraines, followed by prescription drugs (\$5.2 billion), inpatient care (\$0.8 billion), and emergency department visits (\$0.5 billion).

#### *Indirect Costs of Migraines*

The total indirect cost burden borne by U.S. employers is approximately \$12 billion annually, an average of \$404,660 per 1,000 migraine sufferers (AAN, 2007; Kuznar, 2007). Indirect costs include replacement workers, overtime premiums, productivity losses related to unscheduled absences, and presenteeism (Goetzel, Guindon, Turshen, & Ozminkowski, 2001).

Presenteeism is a measure of decreased worker pro-

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ductivity, defined as being present at work but limited in some aspect of job performance by a health problem. It includes time not on task, decreased quality of work (e.g., increased injury rates, product waste, and product defects), unsatisfactory employee interpersonal factors (e.g., personality disorders), and unsatisfactory work culture (Loeppke et al., 2003). Goetzel et al. (2004) reported that migraine and other headaches led the list of 10 conditions with the highest presenteeism-related costs. In addition to lost workdays, the loss of on-the-job productivity for those with chronic pain is substantial. Positive and negative changes in health risks are associated with same-direction changes in presenteeism (Burton, Chen, Conti, Schultz, & Edington, 2006). Stewart (2003) reported that the majority of lost productive time is related to impaired performance (12.7%) versus absence from work (1.1%).

Indirect costs of migraineurs were calculated using the Thomson Medstat health information database to analyze data from 10 large employers during 2002 and 2003. Absenteeism, at a cost of \$9.66 billion, ranked as the number one indirect cost contributor among employees with migraines, followed by short-term disability (\$1.55 billion) and workers' compensation (\$0.78 billion) (AAN, 2007; Kuznar, 2007). Annual indirect costs associated with migraine sufferers averaged \$4,453 per employee, \$2,834 more than for employees without migraines (AAN; Kuznar). More than 50% of individuals with migraines reported experiencing moderate to severe disability in the previous 3 months due to the condition, missing an average of 8.9 days during the previous 3 months compared to non-migraineurs, who missed only 1 day in the previous 3-month period (AAN).

In addition to the indirect costs of lower productivity and loss of function from migraines (the ictal burden of migraines), researchers have demonstrated that quality of life between episodes (the interictal period) is also adversely affected. The interictal burden of migraines, worry about reoccurrence and the effect of migraines on home and work life, may cause migraineurs to over use acute pain medications (Buse & Lipton, 2008).

Effective workplace management of migraines includes screening to detect undiagnosed migraineurs and prevention (i.e., medication to reduce the frequency of migraine attacks and lead to potentially more migraine-free days). The Headache Impact Test (HIT-6) and the Migraine Disability Assessment (MIDAS) are self-administered tools used to measure the impact of migraines. The MIDAS is a survey of five questions that records migraine-related time lost from work or school, household duties, family, or social or leisure activities.

In a recent study, Weaver, Mackowiak, and Solari (2004) found that 62% of the 917 employees who completed the survey reported having migraines with an average pain intensity of 7 for 6 or more days in the previous 3-month period. Fifty-five percent reported moderate to severe disability based on the MIDAS criteria: 26% had moderate disability (MIDAS score of 11 to 20) and 28.6% had severe disability (MIDAS score of 21 or greater). Approximately 40% of employed migraineurs avoided household work for more than 5 days, with almost 10%

missing 15 or more days of household work due to migraine. About 70% reported missing family events and social or leisure activities. Migraineurs' interictal burdens have not been quantified with financial tools. However, occupational health nurses can identify and subsequently attend to the interictal concerns of workers with migraines. The MIDAS questionnaire can be accessed at [www.midas-migraine.net/edu/question/Default.asp](http://www.midas-migraine.net/edu/question/Default.asp).

The HIT-6 can be self-administered via the Internet ([www.headachetest.com/HIT6translations.html](http://www.headachetest.com/HIT6translations.html)). Research using the HIT-6 demonstrated that approximately 30% of those who screened positive for migraines had never been diagnosed with migraine. Despite the high burden of headache among employed migraineurs, only 15% were taking daily preventive medication. For migraine relief, 48% reported using a prescription medication and 79% reported taking a nonprescription medication. Among those employees who reported a previous diagnosis of migraine, 91% screened positive using the HIT-6 tool (AAN, 2007).

The Migraine Interictal Burden Scale (MIBS) is a tool for measuring the global burden of migraines between attacks. This tool assesses the interictal impact of migraine in the domains of work, school, family, or social life impairment, difficulty in making plans or commitments, and emotional, affective, and cognitive distress (Buse & Lipton, 2008). The MIBS items are rated on a 5-point scale: never, rarely, some, much, and most or all the time. They include:

1. My headaches affect my work or school at times when I do not have a headache.
2. I worry about planning social or leisure activities because I might have a headache.
3. My headaches impact my life at times when I do not have a headache.
4. At times when I do not have a headache, I feel helpless because of my headaches.

It is estimated that approximately 40% of frequent migraine sufferers could benefit from preventive therapy, yet only 13% to 15% typically are on a preventive migraine medication. Occupational health nurses may find that these brief, online, easy to administer screening tools may detect those undiagnosed for migraine in the workplace. Workers with positive screenings should be educated by occupational health nurses and encouraged to explore preventive and prophylactic options with their primary care providers.

## ADDRESSING HIDDEN COSTS THROUGH PREVENTION AND TREATMENT AT WORK

### *Detection and Diagnosis*

"Migraine is a chronic, debilitating condition that is under-diagnosed, under treated and misunderstood. Less than half of the 30 million Americans who suffer from migraines are properly diagnosed with the condition" (Kuznar, 2007). Migraine is viewed as a chronic, progressive neurological disease with episodic manifestations (Hahn & Cady, 2008). Migraines most commonly occur among individuals between the ages of 30 and 49, a time when they are actively involved in the work force. Although almost 98% of individuals with frequent mi-

graines take medications, a majority report they are still negatively impacted by the pain and disability associated with migraine. The impact of migraine in the workplace is significant, as more than half of workers with migraine identified through workplace screening report moderate or severe disability and almost two thirds of migraineurs reported having headaches on 6 or more days in the previous 3-month period (AAN, 2007).

Occupational health nurses and workers can be confused by headache nomenclature. Tension headaches were thought to be due to stress. However, stress is one of the major triggers for migraines. Tension headaches are without associated symptoms. Migraine headaches have associated symptoms of photophobia, nausea, and vomiting. Some workers also have dizziness, numbness, fatigue, difficulty concentrating, eye redness, tearing, eye puffiness, blurred vision, double vision, spots before eyes, and partial blindness. Approximately 60% of workers with migraine also have associated neck pain.

Migraine is the only headache associated with the menstrual cycle. Menstrual migraines can occur the week before, during, and after menstruation. Migraines can be unilateral or bilateral. Occupational health nurses can encourage workers to keep headache diaries, an effective strategy to compare cyclical body changes, such as menstrual cycles, with migraine attacks. They also provide a tracking mechanism for identifying migraine triggers as well as the effect of health-promoting behaviors (e.g., healthy eating and exercise).

Classic migraines are actually migraines with aura. Common migraines are migraines without aura. An aura is a group of neurological symptoms that occur within 60 minutes prior to the onset of a headache. An aura can include visual changes, numbness, and weakness. Only one in five individuals with migraines have auras. Another common mistake is diagnosing cluster headaches for workers who develop headaches in spring and fall. Seasonal variance is common for migraine headaches. Cluster headaches are always unilateral and stay on the same side throughout the cluster. They are associated with tearing, sweating, ptosis, and pupil changes. Cluster headaches have short durations, typically 30 to 90 minutes, and are more prevalent in men than women. Migraine headaches, in contrast, are more common in women. Typically, individuals referred to headache clinics have daily headaches or migraine variant. It is helpful to know the type of headaches workers had prior to daily headaches. Some workers have intermittent headaches that become more frequent with time and these individuals slowly begin to over use pain relievers (i.e., more than 2 days a week), resulting in overuse or rebound headaches. Other workers wake up with their first headache and consistently experience daily or near daily persistent headaches.

### **History-Taking Strategies**

Workers' health histories are the most important component of the diagnosis and treatment process. Typically, the clinical examination of workers with migraine is normal except sometimes decreased range of motion in the cervical spine. Brain scans of these individuals

are also benign. Headache questionnaires include questions regarding the frequency of headaches, associated symptoms, description of headache, and typical duration. Occupational health nurses can also use open-ended questions to elicit more information about the ictal and interictal burden of migraines. How do migraines affect your daily living? Your family life? Your social life? How does migraine affect you between attacks? Workers should be asked what they know about migraines, including both prevention and treatment. Occupational health nurses must tailor messages to the responses workers provide to the assessment questions and screening tools.

Occupational health nurses must recognize potential links between comorbidity and headache disability. Saunders, Merikangas, Low, Von Korff, and Kessler (2008) reported that comorbidity is a factor in levels of disability, with 83% of migraineurs and 79% of individuals with other severe headaches having some form of comorbidity (e.g., mental disorders, other pain conditions, or physical diseases). Migraineurs also experienced role disability at least 25% of the month, compared with 17.6% of days for individuals with non-migraine headaches and 9.7% of days for individuals without headaches (Saunders et al.).

Occupational health nurses should review workers' health histories when evaluating medication options. For example, beta-blockers should be used cautiously if workers have asthma or depression. Topiramate and zonisamide can increase kidney stone formation. Zonisamide is not appropriate for workers with renal conditions. Divalproex sodium should be avoided if workers have polycystic ovarian syndrome. Amitriptyline can increase eye pressure in workers with glaucoma. In reviewing workers' health histories, occupational health nurses should ascertain the impact of headaches on workers' daily lives. Most workers can function with tension headaches; however, they have difficulty functioning with migraine headaches. Workers are absent due to pain and associated symptoms of migraines as well as the side effects of medications.

### **Treatment Options During Migraine Attacks**

Occupational health nurses must be knowledgeable about abortive medications, medications used to treat headache attacks. The goal of medications is to abort headaches within 2 hours; an effective abortive medication works at least 80% of the time. Abortive medications include both over-the-counter (i.e., acetaminophen, ibuprofen, naproxen, aspirin, sinus formulas, and combinations with or without caffeine) and prescribed options. These medications may be effective when taken early by some workers. Rescue medications are prescribed when abortive medications fail. Typically, rescue medications include nonsteroidal anti-inflammatory drugs and antiemetic medications.

Prescribed medications, such as triptans, are preferred for more severe migraines. Triptans can be prescribed in a variety of formats. Naratriptan hydrochloride, almotriptan malate, frovatriptan succinate, sumatriptan, rizatriptan benzoate, eletriptan hydrobromide, and zolmitriptan come in tablet form, rizatriptan benzoate and

zolmitriptan have a melt away formula, sumatriptan and zolmitriptan are available in nasal sprays, and sumatriptan has both oral and injectable options. These formulas vary in onset and duration. With quick onset, the half-life is short, 2 to 3 hours. Frovatriptan succinate has a slower onset but a prolonged half-life of up to 26 hours. All triptans are effective, but some brands are more effective for some workers than others; some tolerate some medications more than others. Occasionally, workers do not respond to any of the triptans, which can be challenging for providers. Common side effects include fatigue, nausea, chest tightness, tingling, and neck stiffness. One individual may have similar side effects with several of the brands but not all. Some benefit from adding a nonsteroidal anti-inflammatory drug to the triptan.

The timing of abortive medication is key. Triptans are more effective when taken at the onset of migraine instead of waiting until the headache is severe. Counseling workers regarding symptom monitoring that precedes the migraine and the aura is important. Occupational health nurses can encourage workers to treat the headache at the onset of earlier symptoms called the prodrome. Prodromal symptoms include neck stiffness, fatigue, difficulty concentrating, and clumsiness. Workers are instructed to treat a headache with prodromal symptoms more aggressively than a headache without prodromal symptoms.

Occupational health nurses can help workers understand that although headaches should be treated early, care must be taken not to over use abortive medications (no more than 2 days a week on average). Prophylactic medications are prescribed when workers have two or more headaches a week or eight or more per month.

Despite aggressive treatment, research has shown that headaches do reoccur within 24 hours of discharge from emergency department treatment. Research has also shown that the use of dexamethasone in the treatment of acute migraine in the emergency department is useful only with migraines lasting longer than 72 hours (Friedman et al., 2007). The concern is that despite a variety of treatments, 45% of those discharged from the emergency department after care for a migraine report headache-related functional impairment within 24 hours (Ducharme, Beveridge, Lee, & Beaulieu, 1998). Headache-related functional impairment can affect worksite productivity and increase safety concerns.

### **DECREASING THE FINANCIAL IMPACT OF MIGRAINES THROUGH PREVENTION AND EARLY DETECTION**

Occupational health nurses can promote several prevention strategies in the workplace including the use of screening tools, prophylactic medication options, complementary therapies and lifestyle changes, and worksite considerations. Occupational health nurses can encourage workers to use either an online assessment tool or a paper copy at the worksite. The screening tools can be adjuncts to one-on-one educational sessions with workers. Occupational health nurses might consider using a migraine screening tool in conjunction with annual health risk appraisals, if these assessments are done on a routine

basis in the workplace. Occupational health nurses could also encourage those workers seeking migraine treatment at work to use a migraine screening tool.

### **Prophylactic Medications**

Prophylactic medications are prescribed to reduce the frequency and severity of migraines. Some workers have noted significant improvement on prophylactic medications and an effective abortive medication. However, after weaning off prophylactic medications, the abortive medications may no longer be effective. Reoccurrence of headaches is common after discontinuing many of the abortive drugs.

Three main categories of prophylactic medications include anti-hypertensive, anti-depressant, and anti-epileptic drugs. Occupational health nurses can answer workers' questions regarding treatment by describing the multiple choices in each of these categories. Occupational health nurses can also teach workers about the safety parameters of these medications that might affect their judgments or their performance of safety-sensitive jobs. Food and Drug Administration-approved treatments include beta-blockers and anti-epileptic drugs (divalproex sodium and topiramate) (Ramadan, Silberstein, Freitag, Gilbert, & Frishberg, 2000). Beta-blockers include propranolol, atenolol, metoprolol, and nadolol. Calcium channel blockers include verapamil and diltiazem. The older anti-depressants, such as amitriptyline, nortriptyline, imipramine, desipramine, and protriptyline, are preferred over new drugs. Duloxetine has been approved recently. Divalproex sodium and topiramate are the only Food and Drug Administration-approved anti-epileptic medications for migraines. Other anti-epileptic medications are often used off-label. All these medications are effective, but the challenge is finding a medication that is effective for a particular worker with minimal side effects.

Typically, it takes 6 to 8 weeks before prophylactic medications are effective. Some individuals will have slow improvement. Other clients will have no improvement the first month and then see improvement after the 6- to 8-week period. A common mistake is stopping prophylactic medications too soon. Medications are often prescribed at low doses and then increased with time as needed. Occupational health nurses may need to call health care providers with questions regarding work-related capability in relation to prescribed medications as there are no set target doses for prophylactic medications. The therapeutic dose is based on client response and tolerance. For example, in studies on topiramate, the smallest dose found to significantly decrease the frequency of migraines was 50 mg. More clients benefited from 100 to 200 mg of topiramate daily in divided doses, although some clients had to increase amitriptyline to more than 300 mg before a significant reduction in migraines resulted.

Silberstein et al. (2008) evaluated the efficacy, safety, and tolerability of oxcarbazepine (1,200 mg/d) versus placebo as prophylactic migraine therapy. Although oxcarbazepine was reported to be safe and well tolerated, there was no change in the mean number of migraines



from baseline for the duration of the study over those treated with placebo. Silberstein et al. reported that three anti-epileptic drugs, topiramate, divalproex sodium, and gabapentin, most effective at preventing migraine have multiple mechanisms of action. Oxcarbazepine is a sodium channel blocker, potassium channel enhancer, and calcium current regulator but has no apparent activity on GABA regulation.

The effective use of prophylactic medications can have a positive impact on absenteeism and presenteeism. Open communication among the worker, the occupational health nurse, and the community provider optimizes the use of prophylactic medicine for migraine clients. Lofland et al. measured the effect of topiramate, an anticonvulsant used to prevent migraines, on both absenteeism and presenteeism (AAN, 2007; Kuznar, 2007). Treatment with topiramate had only a small effect on work absenteeism (1 hour per week missed vs. 1.5 hours per week missed). However, topiramate had a much greater effect on presenteeism. When reductions in presenteeism and absenteeism were added together, total lost productive time per month significantly decreased for workers taking topiramate. Use of topiramate resulted in an increase of 9.5 hours of work productivity from a loss of 14.6 hours before treatment to 5.1 hours during treatment. However, lost productivity also decreased for workers taking the placebo, reflecting a significant "placebo effect" in studies of topiramate. Nevertheless, the gain in productivity remained higher with topiramate by reducing presenteeism (AAN, 2007).

### **Complementary Care Options**

Workers with migraine are sensitive to many substances including hormonal fluctuations, weather changes, and diet. The concept of a "sensitive brain" helps workers understand the importance of any treatment (pharmacological or behavioral) that decreases sensitivity to lower the threshold for migraine and potentially lower the risk of disease progression (Hahn & Cady, 2008). Migraineurs have an increased sensitivity to stimuli based on a central nervous system that is progressively sensitized by recurrent migraine attacks. This progression makes the worker more acutely responsive to both external stimuli and medications. Occupational health nurses need to be cognizant of the interactions among over-the-counter supplements, natural remedies, and prescription medications used to treat or prevent migraines. Open-ended questions regarding use of "supplements," "vitamins," and other non-prescribed treatments should be used to elicit information from workers on strategies used to decrease the burden of migraines on their daily activities. Occupational health nurses can also contact complementary therapy providers and become knowledgeable about the various therapies they offer as treatment for migraines.

Multiple supplements that claim they prevent migraines are available. Several medications, including magnesium, riboflavin, feverfew, coenzyme Q10, butbur, melatonin, and ginger, have adequate research to support their effectiveness (National Headache Association, 2007). Many products combine these supplements

into one product. Alternative treatments are often not adequate in treating headaches but rather enhance the treatment of migraines. Clients have benefited from chiropractic care, massage therapy, Reiki, acupuncture or acupressure, physical therapy, biofeedback, relaxation, osteopathic manipulations, cranial-sacral massage, yoga, and reflexology. Clients who feel they have some control over their bodies benefit more from these treatments than those looking for a "magic wand." Workers who are highly sensitive to uncontrollable (i.e., weather) triggers typically need more than alternative treatments. However, clients who report stress as their primary trigger may benefit from these treatments more than medications. Occupational health nurses should encourage workers to ask alternative therapy providers for an estimate of how many treatments at what cost are recommended before judging the effectiveness.

Modifiable risk factors for migraine progression include analgesic over use, sleep disorders, stress, psychopathology, and obesity (Hahn & Cady, 2008). Basic instructions for treatment of migraines include a regular sleep schedule and meals, plenty of fluids, and daily exercise. Dietary triggers such as tyramine and excessive caffeine should also be avoided. Some workers have to make changes in their lives to decrease the stress, including changing jobs. For example, if sleep deprivation is a significant trigger, working a swing shift or night shift job and then taking care of small children during the day may not be a good plan.

### **Worksite Interventions**

Migraine is one of the most disabling conditions in the workplace. Employers can accommodate employees with migraines by prohibiting perfume or cologne and requiring smoke-free workplaces. Ergonomic evaluations have repositioned workstations, decreasing cervicogenic migraines. Computer screens can be altered to decrease glare. Some employees dim lights above their heads or wear hats to decrease glare. A headset is preferred over a standard phone. Some employees take a short break to take medication in a quiet, dark room, aborting a headache or decreasing the severity and finishing the shift. Frequently, workers with migraines request providers write job-restriction letters to decrease the hours worked per day or week. Flex time and other innovative approaches to scheduling may prevent workplace migraines.

Occupational health nurses can reinforce healthy lifestyle habits that address modifiable risk factors to prevent the progression of this chronic, neurological disease. Occupational health nurses can implement worksite health promotion programs to encourage active lifestyles, healthy eating, sleep hygiene, and stress reduction. Occupational health nurses can provide access to screening programs, such as the HIT-6 and MIBS, to assess for ictal and interictal migraine burdens. Occupational health nurses can educate both workers and supervisors on the efficacy of preventive strategies to decrease both absenteeism and presenteeism. Occupational health nurses need to communicate with workers and their providers in structuring the work environ-

## IN SUMMARY

### Working Through a Migraine

Addressing the Hidden Costs of Workplace Headaches

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AAOHN Journal 2008; 56(12), 495-500.

- 1 The financial and personal impact of migraines can be assessed in terms of direct and indirect costs. Direct costs include outpatient office visits, emergency department visits, medications, and inpatient care. Indirect costs relate to replacement workers, overtime premiums, productivity losses due to absence, and loss of on-the-job productivity.
- 2 Effective workplace management can be enhanced through screening and prevention. The Migraine Disability Assessment, Headache Impact Test, and Migraine Interictal Burden Scale can be used to assess the ictal (during a migraine) and interictal (between migraine attacks) burdens of migraines as well as provide coping strategies for migraineurs.
- 3 Occupational health nurses can manage the hidden costs of migraines through prevention and treatment programs. Detection and diagnosis need to be followed by preventive and prophylactic treatments. Complementary treatments and worksite interventions can be useful adjuncts in decreasing the interictal burden of migraines.

ment to prevent the progression of migraines to a more chronic state.

#### SUMMARY

Decreasing the personal and financial impact of migraines in the workplace requires a variety of strategies predicated on collaborative efforts among workers, occupational health nurses, and health care providers. Occupational health nurses appreciate the direct and indirect costs of care, as well as the role they play in helping workers manage the ictal and interictal burden of migraines. Interventions include worksite screening for migraines, preventive and abortive treatments for migraines, and worksite policies and ergonomic accommodations designed to prevent migraines.

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