ASSESSMENT OF MIGRAINE HEADACHE: A PROTOCOL FOR ADVANCED PRACTICE NURSES IN PRIMARY CARE

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ABSTRACT

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Migraine headache is a disorder frequently encountered in the family practice population. Most migraine headache sufferers have never been correctly diagnosed or effectively treated for the disorder. Several barriers have been identified that reduce the likelihood of correct diagnosis and effective treatment of migraine headache disorder. The Health Belief Model provides a theoretical framework for demonstrating how these barriers reduce effective treatment of migraine headaches. The Health Belief Model is modified to illustrate specific migraine barriers and interventions. A Protocol is provided using the International Headache Society criteria for diagnosis of headache disorders for use by advanced practice nurses in family practice. Use of the protocol can improve the effective diagnosis and treatment of migraine headache disorder.

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To my mother, Carol Garrett, who always loved me unconditionally, and remained as proud of me when I failed as when I succeeded.

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INTRODUCTION

Migraine headache is a disorder frequently encountered by the primary care practitioner. The migraine patient population is of special concern to Advanced Practice Nurses (APNs) because all age groups are affected and the disorder is one of the leading reasons for primary care consultations. According to Schiffman, Haley, Baker and Lindgren (1994) headache is one of the ten most common presenting symptoms in general medical practices. Headache is the second most common chronic pain complaint and the seventh leading presenting complaint for ambulatory care encounters in America accounting for 18.3 million outpatient visits per year (Barrett, 1996).

Migraine Headache has been defined as paroxysmal headache separated by headache free intervals and accompanied by two of the following four features; focal cerebral symptoms, nausea, unilaterally, and positive family history (Vahlquist, 1955). Migraine is the manifestation of a hereditary sensitivity of neurovascular reactions to certain stimuli, or to cyclic changes in the central nervous system (Lance, 1993).

Despite the high rate of disabling migraine headache in the family practice population, most patients have never been diagnosed by a practitioner or treated with prescription medications (Saper, 1997). Many patient, provider, and sociodemographic variables exist which act as barriers to appropriate migraine headache diagnosis and treatment. Stang, Osterhaus and Celentano (1994), assert that identifying and eliminating barriers to effective care of migraine patients can reduce the overall impact of the disorder.

THE ADVANCED PRACTICE NURSE IN MIGRAINE DIAGNOSIS AND TREATMENT

The Masters prepared APN has educational preparation and clinical training beyond the basic preparation required to become a registered nurse. APNs conduct comprehensive health assessments and possess advanced skills in the diagnosis and treatment of complex responses of individuals, families, and communities to health problems such as migraine headache disorder. APNs formulate clinical decisions to manage acute and chronic illness and promote wellness. Patient education, research, management, leadership, and consultation are incorporated into their clinical role (Snyder & Mirr, 1995). Studies have shown that APNs can provide better care for the chronically ill than other health care providers (Weiss, 1993). The APN's emphasis on patient counseling and education and firm orientation in the healing, helping, and caring domain, making them excellent practitioners for patients suffering chronic migraine headaches.

Advanced Practice Nurses as Counselors and Educators

APNs are trained to be excellent patient educators specializing in knowledge transmission as a means of empowering patients in their own self care (Snyder & Mirr, 1995). APNs consider patient education to be a communication of facts designed to provide a knowledge base for health activities. These health activities are aimed at increasing the ability of patients to make informed decisions affecting personal well being.

The successful treatment of migraine headache disorder is centered upon lifestyle changes involving diet, exercise, and behavioral modifications. Patient education is the

major focus of nursing intervention in the management of migraine headaches. Information related to general prevention, medication use, side effects, treatment plans, stress management, relaxation techniques, diet, and exercise is essential to client satisfaction and success (Kennedy & Barter, 1994). Health education and counseling by the APN facilitate behavioral change. Patient counseling assists the patient to understand the illness, cope with symptoms, and prevent complications. APNs emphasize counseling as an effective mechanism in helping migraine headache patients manage their disorder.

The Healing Domain of the Advanced Practice Nurse

A trusting one-to-one relationship with the patient, encouraging the verbalization of feelings and conveying a sense of hope and acceptance, is the most helpful to the migraine headache patient (Kennedy & Barter, 1994). APNs are more flexible in their roles with patients than other practitioners and their interactions tend to be more subtle and complex (Pierson, 1997). Differences in practitioner style, make APNs adept at working with the chronically ill migraine patient, and can be attributed to the APN's culture as a nurse and to the APN's orientation in the healing, helping, and caring domain.

Care is the highest form of commitment toward patients (Lewis & Brykczynski, 1994). APNs care for people with and without illness and are not necessarily oriented toward curing. They often go beyond the call of duty and are committed beyond the circumscribed realm of their jobs. It is the nursing culture of caring that differentiates APNs from other practitioners.

The healing domain of the APN involves several competencies under the categories of creating, valuing, attending, and providing. The specific skills involved in these competencies are: creating a healing climate, maintaining self care, giving support, contributing self, protecting dignity, maintaining confidentiality, providing sensitive humor, providing sense of presence, detecting feelings and concerns, monitoring own emotions, risk taking, aiding decision making, communicating through touch, providing emotional and informational support, and preserving personhood and comfort of the patient (Lewis & Brykczynski, 1994). These activities of the healing domain communicate caring and helping between the APN and the patient and aid in building a therapeutic relationship necessary for successful treatment of migraine headache disorder.

APNs have continued the nursing tradition of placing particular emphasis on patient education and counseling (Snyder & Mirr, 1995). This focus on patient empowerment through education, along with the APN's competency in the healing, helping, and caring domain make the APN an excellent practitioner for the migraine headache patient.

BACKGROUND OF THE PROBLEM

Historical Perspective

Throughout history, migraine headaches have been a problem to patients and physicians. References to migraine in the literature ("megrim" or "sick headache") can be found as far back as 3000 BC (Lipton, Silberstein, & Stewart, 1994). Archaeologists believe that ancient cultures attempted as early as 7000 BC to cure headaches by a method known as trepanning. Trepanning involved drilling holes into the skulls of

headache sufferers to release evil spirits and was presumably done using stone knives without anesthesia.

Sumerains in 4000 BC believed that headaches were a curse from the gods. They performed ceremonies and incantations to cure it, as did Egyptians from about the year 1200 BC. Headaches were treated by Galen around 130 to 200 AD by bloodletting and purging. This method may have worked by reducing blood pressure, as did taking an extract from the Ruta plant prescribed by Dioscoride in 77 AD. Various other treatments, such as applying an electric eel to the head to shock away the headache, and taking concoctions made of vulture heads, cow brains and goat dung were tried over the next thousand years. Between the 8th and 3rd centuries BC the Chinese began using acupuncture to treat headaches (Cady & Everett, 1994).

In the 17th century, Sir Thomas Willis theorized that headaches were caused by distention of nerves and vessels in the brain (vascular theory). Eighteenth century physicians suggested a relationship between headaches and diet. In the 19th century, physicians suggested that lifestyle was a factor in headaches and denounced the bloodletting treatments. Bromides, hemp and the forerunners of aspirin and acetaminophen were used with some success (Cady & Everett, 1994). In the late 19th century, Liveing and Gowers formulated the theory that headache resulted from a disturbance in the central nervous system. This became the basis for the neurogenic theory of migraine (Rapoport & Sheftell, 1996). Ergot derivatives were used by the 20th century and became the preferred medical treatment of migraine (Cady & Everett, 1994).

Pathophysiology of Migraine

Headache and its causative factors remain enigmatic for researchers and physicians. Some researchers contend that an intracerebral, meningeal, or extracranial vascular component is associated with release of humoral agents that mediate biochemical changes resulting in headache. Others believe that all clinical aspects of migraine, including the headache, are the result of central processes occurring in the brain and the brain stem (Rapoport & Sheftell, 1996). Some of the more important explanations that account for the headache of migraine are included below; however, a comprehensive study of the pathophysiology of migraine is beyond the scope of this project.

Pain pathways in migraine

Painful stimuli in the periphery of the body cause activation of impulses that travel along small myelinated and unmyelinated fibers that end in the dorsal horn of the spinal column. These nerve fibers synapse with secondary neurons that ascend to the thalamus by way of the spinothalamic pathways. The pain signals are modulated in the dorsal horn by interneurons that contain GABA (enkephalin and gamma-aminobutyric acid). The descending monoaminergic pathways, the serotonergic pathway, and the noradrenergic tract influence the inhibitory neurons. A deficiency in the descending monoaminergic elements can open the pain control gates and allow head and neck pain to occur. Other pain modulating pathways in the brain influence the quality and emotional content of the head and neck pain (Rapoport & Sheftell, 1996).

The role of cortical depression in migraine headache

Migraine is a brain response with a threshold that, when exceeded, initiates an attack. Spreading oligemia and spreading cortical depression of Leao account for the neurological symptoms of migraine with aura. During migrainous aura a burst of neuronal activity is followed by neuronal depolarization that spreads slowly into contiguous brain regions. Brain blood flow may become hyper-oxygenated during the first few minutes of neuronal activation, followed afterward by hyperemia. It is doubtful that ischemia and vasospasm account for the neurologic symptoms (Welch, 1997).

The role of the trigeminovascular system in migraine headache

The trigeminovascular system, which arises in the meninges at the interface of the ends of the primary afferent small caliber C fibers of the fifth cranial nerve, is important in the modulation of headache pain (Rapoport & Sheftell, 1996). Impulses travel along the fifth nerve to the ganglion along the brain stem, into the pons, and down into the trigeminal nucleus caudalis. Pain is registered after the impulses reach the thalamus and then the cortex.

According to Welch (1997), migraine headaches have been attributed to activation of the trigeminovascular system by as yet undetermined mechanisms. It is thought that during a migraine headache, peptides may be released from trigeminal sensory axons, producing neurogenic inflammation and local vasodilatation. A calcitonin gene-related peptide is released into jugular venous blood during a migraine attack, causing a neuropeptide mediated inflammatory response resulting in head pain (Welch, 1997).

The role of serotonin in migraine headache

The platelets of migraine patients are often hyperaggregable. Much of the serotonin in the human body is stored in the platelets. Shortly before a migraine headache begins, platelet serotonin increases and then decreases during the attack. The result is increased excretion of the main metabolite of serotonin, 5-hydroxyindoleacetic acid 5-HIAA in the urine following the migraine attack. There is also evidence of a platelet release reaction in migraine and an increase in Beta-thromboglobulin during migraine headache, suggesting platelet activation. After serotonin is released from the platelets it acts (with other chemicals and neuropeptides) as a potent vasoconstrictor.

So far, seven 5-HT receptors have been identified. These receptors are found in the meninges, the cortex, in brain stem nucleii, and in deeper structures of the brain. There are two important serotonin receptors involved in migraine headache: 5-HT1 receptors can terminate attacks of headache, and 5-HT2 receptors can prevent attacks. This information is helpful in explaining why both serotonin agonists and serotonin antagonists are helpful in treating migraine and are often prescribed for headache sufferers (Rapoport & Sheftell, 1996).

The Role of Genetics in Migraine Headache

Migraine is a complex and common familial disorder that exhibits no clear-cut mode of inheritance. Migraine is more common in females and is more frequently transmitted on the maternal side; however, this difference has yet to be explained by transmissible genetic factors. Thirty to fifty percent of the variance in migraine can be attributed to genetic factors, which suggests that non-transmissible factors explain at least half of the variance as well. The specific factors that may be inherited in migraine are not

known (Merikangas, 1990). Recent studies of migraine heritability confirm that migraine is present more frequently in first degree relatives of migraineurs than in first-degree relatives of non-migraineurs. These studies also show that the mother of a given migraine sufferer is more likely to be affected than the father of the migraineur, suggesting maternal inheritance. In addition, genetic influence in migraine with aura seems to be stronger than in migraine without aura (Joost, Terwindt, & Ferarri, 1997).

Many researchers have investigated the mode of inheritance in migraine, and many possibilities have been considered including: dominant in women and recessive in men, dominant in both sexes with 100% penetrance in women and 40% penetrance in men, recessive with varying degrees of penetrance, and finally polygenic. It seems clear that there is a strong component of heredity involved in migraine, but researchers have yet to clearly define it (Couch, 1994). Studies have been hampered in the past by the lack of a valid definition of migraine, the lack of a standardized method for determining symptom criteria, the high prevalence of migraine in the population, and unpredictable patterns of age and sex expression (Merikangas, 1990).

Comorbidity of Migraine and Other Disorders

The term comorbidity refers to the presence of coexisting illnesses or syndromes in a patient with a specifically identified disease such as migraine headache disorder. The main reason comorbid disorders are investigated is to discern if both conditions emanate from the same underlying causal factors. Investigation of migraine and other disorders may reveal risk factors and underlying pathophysiology that are common to both disorders and may shed new light on the primary disorder (Merikangas & Stevens, 1997).

Migraine comorbidity, according to Stang and Osterhaus (1994), can increase disability, health care utilization, or a patient's risk of adverse outcomes.

Psychiatric cormorbidities are commonly associated with migraine. Merikangas and Stevens (1997) report that depression and anxiety disorders are clearly more common among migraineurs. In addition, longitudinal studies have demonstrated that the onset of these disorders in the same person follows a predictable course: anxiety in childhood, followed by migraine headache disorder in adolescence, and then the onset of depression in later years. Rapoport and Sheftell (1996) believe a possible cause of this phenomenon may be a disorder of the biogenic amines and neuropeptides that regulate mood and play a role in the primary headache disorders. Specifically, serotonin is thought to be a critical factor in anxiety, depression, migraine headache disorder, eating disorders, obsessive compulsive disorders, and vasospasm. In the case of migraine and psychiatric disorders it may be that each disorder increases the risk of onset of the others; shared neurobiological or psychobiological mechanisms may underlie both.

Physical conditions thought to be comorbid with migraine include ischemic stroke, cardiovascular disease, hypertension, gastrointestinal disorders, allergies, asthma, seizure and other neurologic disorders, and preeclampsia. Migraine headache patients are twice as likely to suffer from chest pain than their cohorts matched for age, smoking, and asthma history (Stang, Sternfield, & Sidney, 1994). A recent study showed that children with migraine have a high incidence of hypercholesterolemia. These children often come from families with a history of myocardial infarctions and cerebrovascular accidents as well as migraine headache disorder (Joost, Terwindt, & Ferarri, 1997). The studies concerning migraine and coronary heart disease have revealed increased rates of

myocardial infarction among the parents and other relatives of migraineurs. After controlling for smoking there is no significant increase in the rate of heart disease in the migraine patients themselves. There is however, a correlation between migraine headache and higher systolic blood pressure readings in patients over forty. Age matched controls without migraine have lower systolic blood pressure readings (Merikangas & Fenton, 1994).

Several studies have demonstrated an association between migraine and subsequent stroke. Buring and associates (1995) report a significantly increased risk of stroke in physicians with a self-reported history of migraine headaches. Others have found the relationship between migraine and subsequent stroke to be stronger in patients with a history of migraine with aura (Merikangas & Fenton, 1994) and in young female patients with migraine history. Merikangas, Fenton, Cheng, Stolar, and Risch (1997) have recently reported that there is a non-random association of history of severe headache, migraine headache, and subsequent stroke, particularly in young women (under 45) with a history of migraine. These researchers advise that severe headache and migraine history should be considered as risk factors for the development of stroke, particularly in the absence of other established risk factors.

Merikangas, Fenton, Cheng, Stolar, and Risch (1997) hypothesize that mechanisms for the association between migraine and stroke include irregularities in blood flow, vascular hyperactivity or structure, cardiac abnormalities such as mitral valve prolapse, immunologic factors, and abnormal production or function of vasoactive substances, including prostaglandins, noradrenergic and cholinergic transmitters and receptors, nitric oxide, and histamines. Buring and associates (1995) postulate that

abnormalities in platelet aggregability and secondary changes in blood flow may predispose to cerebral infarction.

This information is useful to primary care practitioners treating migraine headache patients. Treatment of migraine is likely to be much more successful if coexisting anxiety and depressive disorders are treated as well (Rapoport & Sheftell, 1996). In addition, young women with migraine may need screening for potential risk factors for stroke such as smoking and oral contraceptive use, particularly in light of recent evidence linking migraine to subsequent stroke in young women. All migraine headache patients may benefit from lifestyle interventions known to reduce the risks of stroke, hypertension, and coronary heart disease.

The modes of inheritance, pathophysiology, and comorbidities of migraine headache disorder still require much investigation before they will be clearly defined and well understood by researchers. Ongoing research in these areas will hopefully contribute to a knowledge base that can enable practitioners to better treat the painful headache of migraine as well as identify risk factors for conditions known to be comorbid with migraine.

SIGNIFICANCE OF THE PROBLEM

Prevalence

Migraine is a common and disabling headache disorder with a large socioeconomic impact and significant adverse effects on quality of life. Approximately 23 million Americans suffer from migraine headache, and 11 million of these experience significant levels of headache related disability (Lipton & Stewart, 1994). Migraine

headache affects 17.6 percent of females and 6 percent of males between the ages of 12 and 80 according to Lipton and Stewart (1993) causing significant suffering and disability. According to Solomon (1994), as many as 18 percent of women and 6 percent of men experience migraine and more than half of them report significant disability with migraine attacks. Commonly affected by the disorder are those between the ages of 25 to 44, which are the years of greatest earning potential, resulting in great societal costs in lost productivity (Stang & Osterhaus, 1993).

To further complicate an already challenging set of problems, it appears that the prevalence of migraine may be increasing. According to Lipton and Stewart (1997) prevalence of migraine increased 60 percent from 1981 to 1989. Some of this increase may be due to greater public awareness, or increased consultation and diagnosis rates; however, recent studies suggest an actual increase in the prevalence of migraine. Lipton and Stewart assert that an explanation for these findings is required (1997).

Headache Related Disability

Disability is defined as the extent to which headaches interfere with a person's ability to engage in his or her usual activities (Lipton & Stewart, 1993). As many as 26% of undiagnosed and 50% of diagnosed migraineurs suffer with severe disability. Disability is likely to be increased with moderate to severe pain, nausea, vomiting, numbness, and tingling. Intractable nausea or vomiting may be as disabling as the pain. Migraine aura produces disability by impairing vision or disrupting motor or somatosensory function. Photophobia and phonophobia may lead to restricted activity and limited social interaction. Confused thinking, which is common with migraine, effects efficiency and competency on the job and at home (Lipton & Stewart, 1994).

Financial and Functional Impact For Migraine Sufferers

The financial impact of migraine for society and individuals is staggering, with estimates of up to 17 billion dollars in lost productivity per year (Saper, 1997). Migraineurs in the United States have been reported to spend more than 3 million days each month incapacitated and bedridden by headache and associated symptoms. In addition, employed male migraineurs average 2.7 million, and employed female migraineurs spend 18.8 million days per year with activities restricted by migraine attacks. The average male migraine sufferer costs $6,684 per year in lost productivity and the average female migraineur costs $3,600 (Rapoport, 1994). Stang and Osterhaus, (1992) reported that housewives experienced an estimated 38 million days per year of restricted activity due to migraine attacks. Twenty five percent of the estimated 23 million migraineurs in America experience frequent attacks (4 or more per month). Thirty five percent have one to three attacks per month, and 40% experience one or fewer attacks per month (Lipton & Stewart, 1997).

Migraine is an increasingly prevalent and disabling headache disorder with enormous effects on quality of life for sufferers and socioeconomic impact on society. Continued research is needed in the area of migraine headache identification and treatment to ameliorate the effects of this disorder.

STATEMENT OF THE PROBLEM

Migraine headache is a commonly encountered problem that is underdiagnosed and undertreated in primary care practices, with resulting enormous personal and economic losses for patients and society. APNs must overcome several barriers that prevent correct diagnosis and treatment of migraine headache resulting in poor

management of migraine headache patients. The International Headache Society Diagnostic Criteria For Headache Disorders, and the Health Belief Model, which emphasizes the role of barriers in the decisions patients make about seeking health care, are helpful in guiding the APN in making correct diagnoses and reducing barriers to migraine treatment.

PURPOSE OF THE PROJECT

The purpose of this project is to provide APNs in primary care with a clinical protocol using the International Headache Society Criteria For Headache Disorders, guided by the Health Belief Model, for the accurate assessment and diagnosis of migraine headaches. Use of the protocol will aid in improving accurate diagnosis and treatment of migraine patients. The barriers to seeking consultation for and complying with migraine treatment will be examined within the context of the Health Belief Model. Understanding patient and practitioner characteristics that have been identified as barriers to effective diagnosis, and use of the IHS criteria will assist the nurse practitioner in forming an accurate headache diagnosis and ensuring patient compliance.

LITERATURE REVIEW

This literature review will focus on several points that are critical to the APN in understanding the problems with treatment of migraine headache in primary care. There are many sources that elaborate upon these points and provide essential information for family practitioners treating migraine patients. This information is helpful for primary care providers seeking to eliminate barriers to migraine diagnosis and treatment.

Migraine Headache is Commonly Encountered in Primary Care

Headache, a common complaint among adult outpatients, is the most frequent pain complaint confronted by primary care physicians, and is the seventh to tenth leading presenting complaint for ambulatory care encounters in the United States (Barrett, 1996; Capobianco, Cheshire, & Campbell, 1996, Kumar & Joos, 1996; Lipton, Silberstein, & Stewart, 1994; Schiffman, Haley, Baker, & Lindgren, 1994; Stang & Osterhaus, 1994). At least 40 million Americans seek medical help each year for headache disorders, 23 million of whom are specifically diagnosed as migraine (Saper, 1997; Weiss, 1993).

In the United States, migraine headache is a highly prevalent condition occurring in 18% of females and 6% of males greater than 12 years of age (Capobianco, Cheshire, & Campbell, 1996; Lipton & Stewart, 1994; Rapoport & Sheftell, 1996; Saper, 1997; Solomon, 1994; Stang & VonKorff, 1994; Stewart, Shechter, & Rasmussen, 1994; Welch, 1997). Migraine sufferers who consult physicians most often seek help from their primary care practitioner first, making migraine headache disorder of principle importance to primary care providers (Capobianco, Cheshire, and Campbell, 1996; Kumar & Joos, 1995; Lipton, & Stewart, 1994; Rapoport & Sheftell, 1996; Saper, 1997; Stang, Sternfield, & Sydney, 1995).

Migraine Headache Disorder is Frequently Misdiagnosed and Underdiagnosed

In spite of the reported high prevalence of migraine headache disorder in the general population, physicians often fail to diagnose the condition, or misdiagnose migraine headache disorder (Cady, 1994; Campbell, 1990; Capobianco, Cheshire, & Campbell, 1997; Saper, 1997; Stang, Sternfield, & Sydney, 1995; Stang & VonKorff, 1994; Silberstein, 1994; Solomon, 1994). Only 30 to 51% of migraineurs who seek care

and fulfill IHS criteria for migraine receive the correct diagnosis (Gobel, 1994; Stang, Osterhaus, & Celentano, 1994). High rates of headache-related disability have been documented yet most people with migraine have never been diagnosed by a physician nor treated with prescription medications (Lipton & Stewart, 1993).

Migraine Headache is Often Undertreated

Migraine headache is not only misdiagnosed, but ineffectively treated as well. Even among migraineurs who receive the correct diagnosis, undertreatment is common, resulting in unnecessary pain and disability (Capobianco, Cheshire, & Campbell, 1996; Lipton & Stewart, 1993; Lipton, Stewart, & VonKorff, 1994; Rapoport & Sheftell, 1996; Saper, 1997; Silberstein, 1994; Solomon, 1994; Stang, Osterhaus, & Celentano, 1994).

Migraine Headache is Costly

The cost of migraine headache to patients in terms of lost income from work and inability to fulfill family and social obligations is enormous. Employers, and society in general, experience economic losses in terms of reduced productivity of people suffering from migraine headache disorder (Lipton & Stewart, 1994; Lipton, Stewart, & VonKorff, 1994; Lissovoy & Lazarus, 1994; Rapoport, 1994; Rasmussen, Jensen, & Olesen, 1994; Saper, 1997; Solomon, 1997; Stang & Osterhaus, 1992; Stang, Osterhaus, & Celantano, 1994; Welch, 1997;).

Migraine results in a significant number of missed days of school or work, or otherwise restricted activity, for headache sufferers. Fifty-two percent of migraineurs report that headaches disrupt their daily activities and two thirds missed work due to migraine or worked an average of five days per month with migraine. These migraineurs who work while ill estimated their headaches reduced their effectiveness on the job to an

average of about 57% of their normal performance (Stang, & Osterhaus, 1992). According to Welch (1997) 8% of males and 14% of females miss all or part of a day of school or work in any one month, and Barrett (1996) asserts that migraineurs miss 150 million work days annually.

The annual cost to employers in terms of lost productivity varies widely but has been estimated as 1.4 to 1.9 billion dollars (Stang & Osterhaus, 1992), 3 billion (Barrett, 1996; Solomon, 1994), 1.2 billion to 17.2 billion (Capobianco, Cheshire, & Campbell, 1996; Lipton & Stewart, 1994; Rapoport, 1994; Saper, 1997; Welch, 1997) and 57 billion dollars in annual cost to business, with 4 billion dollars spent on over the counter analgesics (Weeks & Baskin, 1994). The cost of reduced productivity for homemakers in terms of household maintenance and childcare is very difficult to quantify (Stang & Osterhaus, 1992).

The direct costs of migraine headache disorder to patients can be measured not only in lost income from work absenteeism but in medical expenses as well. Direct costs include diagnosis, treatment, medication, and sometimes hospitalization and rehabilitation (Lissovoy & Lazarus, 1994). Stang and Osterhaus (1992) reported that 648 migraineurs spent $529,000 per year in migraine related health costs, an average of $817 per person. Rapoport (1994) estimated itemized migraine related medical costs to range from $53 to $64 for a physician office visit, $111 to $201 for a hospital clinic or emergency room visit, and for medical supplies, including prescription medications to range from $2.75 (prescription co-pay) to $50. The average cost of diagnostic procedures ranged from $300 for lumbar puncture to $700, $1000, $225, and $2,800 for CT scan, MRI, EEG, and arteriography, respectively.

Barriers to Migraine Diagnosis and Treatment

Several barriers have been identified that function to reduce the likelihood of not only diagnosis but also effective treatment of migraine. Several authors assert that in order to improve the diagnosis and treatment of migraine headache disorder, barriers to treatment must be eliminated (Lipton, Amatniek, Ferrari, & Gross, 1994; Lipton & Stewart, 1993; Rapoport, 1994; Saper, 1997; Silberstein, 1994; Spierings & Miree, 1993; Stang & Osterhaus, 1992; Stewart & Lipton, 1994). Identifying and eliminating barriers to effective care of migraine headache patients can reduce the overall impact and direct costs of the disease (Stang, Osterhaus, & Celentano, 1994).

According to Lipton, Amatniek, Ferrari, and Gross (1994) barriers to effective treatment for migraine exist on three levels: 1. Many migraine sufferers do not consult medical providers. Several patient characteristics have been identified which may be associated with reluctance to seek medical care for headache disorders. 2. Those who consult may not receive the correct diagnosis. Lack of familiarity with headache disorders, lack of valid case definition, and physician bias may explain why practitioners often fail to recognize migraine headache disorder. 3. Those who consult often do not receive effective treatment. Practitioners often fail to adequately treat migraine symptoms, or fail to establish a satisfactory relationship with the patient; both situations frequently result in patient noncompliance or discontinuation of treatment (Spierings & Miree, 1993).

Patient characteristics as treatment barriers

Recent epidemiological studies screening for migraine sufferers in the general population have provided insight into the prevalence and distribution of migraine.

Migraine headache seems to be an enormous problem for patients, yet many sufferers may have never consulted a physician for the problem (Lipton, Silberstein, & Stewart, 1994). Certain personal characteristics of migraine sufferers may create barriers to migraine diagnosis and treatment. According to Rapoport (1994), characteristics that make migraine diagnosis less likely include: male gender, low- income status, symptom profile (excluding visual aura, nausea, vomiting, or disability), and patient use of over-the-counter medications. According to Lipton and Stewart (1993), low-income individuals have the highest prevalence of migraine and the lowest rate of diagnosis. Stang and Von Korff (1994) report that the presence of chronic headache, emotional distress, and the absence of disability reduce the likelihood of a migraine diagnosis. Most physician-diagnosed cases of migraine are in women, because they are more likely to consult physicians. In addition, older people who have had the disease for a longer period of time, and those in higher income brackets with greater access to health care are more accurately diagnosed with migraine headache disorder. Males, younger patients, those without disturbing or extremely uncomfortable symptoms, and patients who obtain varying levels of relief with over the counter medications are less likely to consult physicians for headache symptoms (Silberstein, 1994). The patient's lack of knowledge about symptoms that differentiate migraine headaches from other headache syndromes is also an important barrier preventing them from seeking medical consultation. According to Saper (1997), many who experience headaches have not consulted a physician, and only 50 percent of undiagnosed migraineurs correctly identify their headaches as migraine.

Incorrect diagnosis as a treatment barrier

Many patients who consult physicians for headache disorders do not receive the correct diagnosis for their problem. This practitioner-related barrier to migraine diagnosis and treatment represents a great impediment to effective migraine symptom control. Migraine headaches are consistently misdiagnosed and undertreated according to Stang, Osterhaus, and Celentano (1994). They report that among migraineurs who seek care, clinicians recognize only 45 to 51 percent as migraineurs.

Another practitioner-related barrier to accurate migraine diagnosis is physician bias. Many primary care physicians feel uncomfortable managing migraine patients because they lack formal training in the diagnosis and management of headache. Physicians often perceive that managing headache patients is time consuming and that patient psychosocial issues will complicate treatment. In addition, chronic headache patients are viewed as analgesic abusers and physicians are reluctant to assume responsibility for their care (Kumar & Joos, 1995). This sort of physician bias can constitute a very real barrier to migraine treatment.

A major problem in accurately diagnosing migraine headaches in the past has been the lack of a reliable and valid case definition (Merikangas, 1990). The IHS in 1988 published a set of guidelines for the classification of headaches, which has greatly facilitated the definition of migraine in the context of other forms of headache. It has also enabled studies on migraine to be conducted on a more comparable basis (Olesen, 1994). Until the introduction of the IHS diagnostic criteria, diagnosis of migraine in primary practice was often much more difficult than it had to be, resulting in poor management of migraine patients.

Ineffective treatment as a barrier

Migraineurs often do not receive effective treatment for their condition, even when the correct diagnosis is made. A recent study revealed that 25% of migraineurs, when consulting a physician for headaches, were not asked about nausea and vomiting (Saper, 1997). Nausea and vomiting are critical features of migraine diagnosis and migraineurs with nausea are twice as likely to be disabled by their headache symptoms. The practitioner's failure to recognize and treat these symptoms causes even accurately diagnosed migraineurs to suffer unnecessarily.

A major determinant in whether or not the patient receives effective treatment may be the patient's degree of compliance with the treatment plan. Many migraine patients do not comply with treatment plans and follow-up schedules once they have received a correct diagnosis. Stang, Osterhaus, and Celentano (1994) state that slightly more than half of migraineurs who do not return for follow up care report dissatisfaction with the physician or problems with the medication regimen.

Spierings and Miree (1993) agree that the main reason for lack of compliance and follow-up is patient/practitioner relationship. They further assert that quality of communication, time spent with the patient, perceived friendliness, empathy, and interest of the practitioner are key factors in patient compliance. Studies have shown that if the practitioner spends more time with the patient, shows concern, friendliness, and interest, and tries to address the patient's expectations and concerns, patients will feel more satisfied with clinical interactions. As a result, the patient will be more likely to comply with treatment (Spierings & Miree, 1993).

IHS Criteria for the Diagnosis and Classification of Headache Disorders

In 1988 the International Headache Society, (IHS), published a new classification and diagnostic criteria for all headache disorders, cranial neuralgias, and facial pain. This comprehensive system reflects the consensus of an international panel of experts on headache disorders. The IHS system divides headaches into 13 major types, which include 129 headache subtypes. The first 4 items in the IHS classification comprise the primary headache disorders, which represent 90% of all headaches. The remaining items are the secondary headache disorders.

Many headache specialists endorse the IHS criteria for use in research and clinical settings. The new IHS criteria are a comprehensive classification system and provide an important step in standardizing headache diagnosis with specific, unambiguous diagnostic criteria. This will allow clinicians to diagnose headache disorders more uniformly than before (Barrett, 1996; Cady, 1994a; Couch, 1994; Delessio, 1994; Olesen, 1994; Olesen & Lipton, 1994; Rasmussen, Jensen, & Olesen, 1994; Saper, 1997; Solomon, 1997; Whitney, 1990).

The IHS classification has been found by many researchers to have high reliability, (substantial at both the one and two digit levels), and validity, and to have good sensitivity and specificity, making them useful not only in the clinic but in research studies of migraine as well (Granella et al., 1994; Iversen, Langemark, Andersson, Hansen, & Olesen, 1994; Merikangas, Dartigues, Whitaker & Angst, 1994; Saper, 1997; Solomon, 1997; Stewart, Shechter, & Rasmussen, 1994). The IHS criteria have been reported to have good interobserver agreement on headache diagnosis as well (D'Amico, Leone, Fillipini, & Bussone, 1994).

Patient-Practitioner Relationship is Critical in Successful Migraine Treatment

Headache specialists agree that the most important aspect of effective treatment of migraine headache disorder is a good patient-practitioner relationship. Individualization of therapy is essential and patient priorities must be taken into account (Saper, 1997). The relationship must be characterized by effective communication with an emphasis on teamwork (Capobianco, Cheshire, & Campbell, 1996; Welch, 1997). The practitioner must show compassion, empathy, and understanding as they counsel and educate the migraine patient (Cady, 1994; Kennedy & Barter, 1994; Spierings & Miree, 1993; Rapoport & Sheftell, 1996; Smith, 1994; Weeks & Baskin, 1994; Weiss, 1993; Welch, 1997).

Migraine headache is a disorder that is frequently encountered in primary care and is often misdiagnosed and undertreated by practitioners. Migraine headache has financial and social costs for individuals and society. Treatment of migraine headache is impeded by patient characteristics, problems with diagnosis, and ineffective treatment, which function as barriers to migraine care. Improvement of patient/practitioner relationships and use of the IHS criteria for headache diagnosis can result in better quality of care for migraine patients.

THEORETICAL FRAMEWORK

The Health Belief Model

The Health Belief Model was developed by Hochbaum, Kegeles, Leventhal, and Rosenstock in the early 1950's in response to a need by the Public Health Service to convince individuals to embrace the concept of preventive health care. According to Rosenstock (1974), the theory focuses on the current dynamics confronting the

individual, rather than on the historical perspective of his/her prior experiences. The model was initially proposed to explain preventive health behavior. It was later adapted to explain illness and sick role behavior, such as compliance or lack of compliance with treatment plans.

The model proposes that an individual's subjective state of readiness to take action and engage in health related behaviors is a function of several factors. In order for an individual to take action to avoid a disease, the person needs to believe that: (1) he or she is personally susceptible to the disease, (2) the event of contracting the disease would have at least a moderately severe effect on some component of the individual's life, and (3) taking a particular action would be beneficial by reducing susceptibility to, or severity of, the disease. According to the model, the perceived barriers in taking health related action, such as cost, convenience, embarrassment, and pain, must be outweighed by the benefits of taking action, such as reduction of the risk of occurrence or severity of the disease (Rosenstock, 1974). A cue to take action, such as a perception of a bodily state, (internal cue), must occur to trigger the appropriate health behavior. Various demographic, personal, social, and structural factors are viewed as modifying variables that can influence an individual's health-related perceptions but are not considered to be direct causes of health action.

As shown in Figure 1, the individual's perceptions of susceptibility are altered by variables such as age, sex, and social class. Cues to action interact with these variables to represent a perceived threat of disease. The likelihood that the individual will take health related action becomes a function of his/her perceptions of the benefits of the action minus the barriers to taking the action (Rosenstock, 1974).

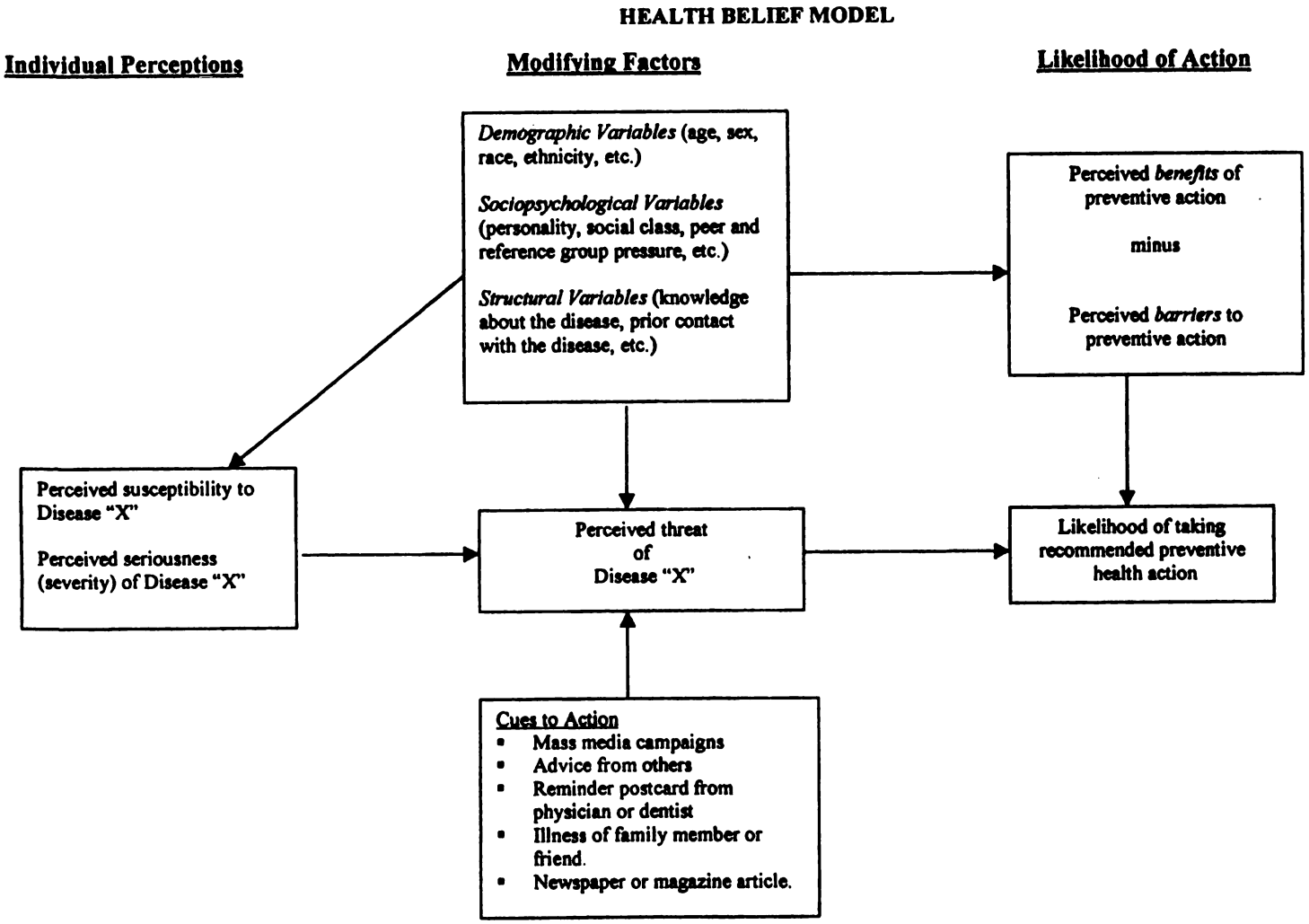


Figure 1, The Health Belief Model as Predictor of Preventive Health Behavior (Becker, 1974).

The Health Belief Model has been useful in predicting both health behavior before illness, such as willingness to undergo cancer screening, and health behavior during illness, such as compliance with medical regimens or prescribed therapies. It provides a useful framework for intervention, especially in understanding and reducing barriers to care (Becker, 1974; Rosenstock, 1974; Feuerstein, Labbe, & Kuczmierczyk, 1986; Steptoe & Mathews, 1984; Stroebe & Stroebe, 1995). According to Rosenstock (1974), practitioners can increase patient response in the following ways: (1) minimizing the barriers to action, (2) increasing the opportunities to act, which will increase perceived benefits, and (3) provide cues to trigger responses. By assessing the barriers to compliance, the practitioner can individualize interventions to suit the particular needs of the patient (Becker, 1974; Feuerstein, Labbe, & Kuczmierczyk, 1986).

Health Belief Model Barriers: How They Effect Migraine Patient Decisions to Seek Care

An examination of the role of illness behavior using the Health Belief Model is helpful in understanding how four specific barriers to migraine diagnosis and treatment, (gender, socioeconomic status, over the counter medication use, and practitioner/patient relationship), effect the patient's decision to seek or comply with care. According to Kirscht (1974), behavioral decisions are made to avoid negatively valued outcomes. In other words the health care action to be taken must reduce the threat of pain and disability in the migraine patient. The personal threat inherent in an illness is weighed against the threat of role loss that may occur if the illness is actually found to be present. In health

belief terms, the cost of a course of action to reduce a threat becomes important when evaluating a given symptom, in this case, headache.

Male gender acts as a barrier to migraine headache diagnosis and treatment in the Health Belief Model, because having a headache disorder, (or any other illness), may be perceived as a threat to the integrity of the male role. According to Kirscht (1974), the threat of an illness is weighed against the threat of role loss, and in childhood boys clearly learn to appear unafraid and to deny symptoms. This may make them less likely to present to the APN for headache treatment.

The patient's use of over the counter medications to treat headache functions as a barrier to migraine diagnosis and treatment in the Health Belief Model. Decisions to self-treat are complicated, but it seems these decisions are based on beliefs about symptoms, the possibility of future conditions, and the perceived efficacy of the action. When faced with threatening symptoms, (such as headache), the patient's belief in the efficacy of a wide range of actions increases (Kirscht, 1974). Self-treatment of headache influences the practitioner's decision to treat the patient's symptoms and actually functions as a barrier to correct diagnosis and treatment of migraine. In addition, if the patient uses over the counter medications and obtains some measure of relief he/she will be less likely to believe it is a migraine headache and will be less likely to present to the practitioner for treatment. Unfortunately, the use of over the counter medications alone is often inadequate for treatment of migraine headaches. Use of the same over the counter medications; however, supplemented with anti-emetics and counseling and teaching about diet, exercise, and lifestyle changes can constitute very adequate treatment for many migraineurs. The patient may never have the benefit of these additional therapies if

they do not present for treatment, or if the practitioner fails to diagnose them or under-treats them because they are using over the counter medications.

Low income status of patients functions as a barrier in the Health Belief Model by reducing the perceived value of possible benefits of treatment. Kirsch (1974) asserts that it may be that situational barriers that become chronic, such as poverty, lack of transportation, family problems, and negative experiences with agencies and providers, lead to pessimistic beliefs and low motivation. Situational factors such as low income may create negative orientations that serve as rationalizations for failure to seek care. These situational factors enter into health care decisions and need to be incorporated into the psychological benefits and barriers to seeking care (Kirsch, 1974).

An unsatisfactory practitioner/patient relationship acts as a barrier to migraine diagnosis and treatment in the Health Belief Model, with the indirect result manifested in the patient's failure to comply with treatment regimens. According to Becker (1974), in circumstances where the practitioner is formal, rejecting, controlling, disagrees with the patient, or interviews the patient at length without subsequent feedback, patient non-compliance often results. When patients perceive lack of warmth in the practitioner/patient relationship and fail to receive an explanation of the illness, non-compliance is high. When the patient is satisfied with the initial contact, perceives the practitioner as friendly, and feels that the practitioner understands the complaint, compliance is better (Becker, 1974).

Modifying the Health Belief Model to Facilitate Care of Migraine Patients

The Health Belief Model's emphasis on barriers to taking health related action is very helpful to the APN in understanding the reluctance of migraine patients to seek care

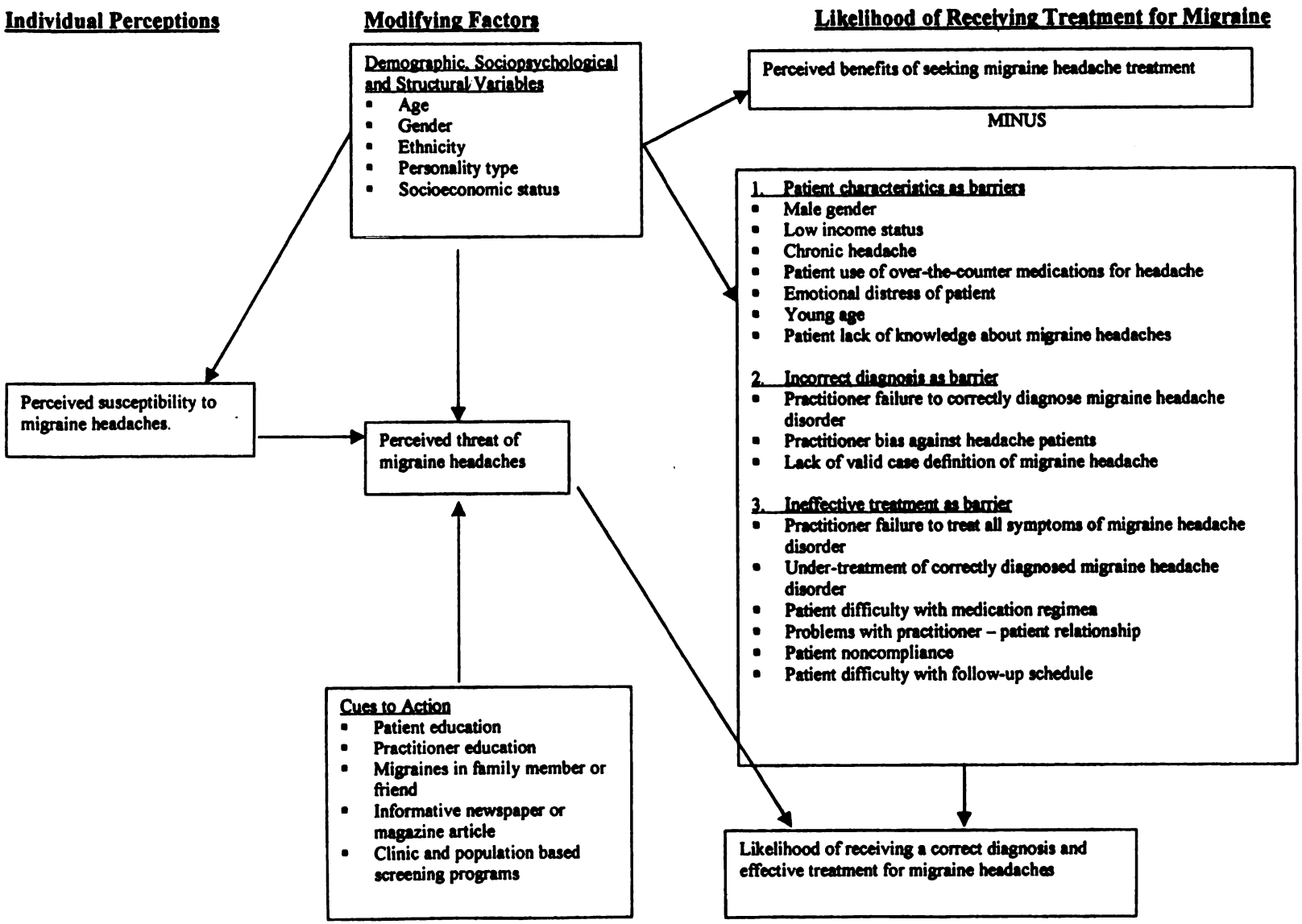
and their frequent non-compliance after initiating medical consultation. Becker (1974), asserts that the elements of the Health Belief Model associated with individual's decisions in the areas of seeking preventative health care also apply to compliance with prescribed regimens in persons already diagnosed with an illness. The Health Belief Model can be modified to facilitate the APN's understanding and care planning for migraine patients by expanding upon or focusing on the patient's perceived barriers to treatment. Other elements of the health belief model, such as cues to action, and perceived benefits of taking health related action, can also be remodeled by the practitioner for the requirements of individual patients (Becker, 1974).

The following paragraphs detail the modification of the original Health Belief Model to facilitate understanding and care planning for migraine headache patients. The Migraine Headache Health Belief Model illustrates variables specific to migraine patients and elucidates barriers to treatment. The Migraine Headache Interventional Health Belief Model is a further adaptation of the Migraine Health Belief Model demonstrating the migraine patient's internalization of the APN's migraine teaching. In addition the interventional model incorporates interventions designed to reduce the patient's barriers to treatment.

The Migraine Headache Health Belief Model

The Migraine Headache Health Belief Model starts with the headache patient's perception of susceptibility to migraine headache disorder, which may be reduced due to lack of familiarity with migraine headache as a possible personal diagnosis (see figure 2.)

MIGRAINE HEADACHE HEALTH BELIEF MODEL



The headache patient is aware that they have headaches but fail to realize they may be suffering from migraine headaches. According to Solomon (1994), the results of a questionnaire using the IHS criteria for migraine completed by a random sample of 20,000 people throughout the United States, indicated that only 29 percent of men and 41 percent of women who suffer with headaches, know they have migraine disorder. The majority who had migraine (as judged by their answers) did not recognize that they were suffering migraine headaches. Many migraine headache sufferers may never perceive personal susceptibility to or severity of migraine headache disorder and therefore fail to recognize cues to action, thus precluding the possibility of diagnosis and treatment. In the opinion of this author, the patient's lack of knowledge about personal susceptibility, severity of, and threat of the disease constitutes a barrier to treatment that can be better understood using the Migraine Headache Health Belief Model.

The modifying factors which are thought to influence an individual's health related perceptions but are not direct causes of health related action, are also related to possible barriers of health care seeking in migraine patients in the Migraine Headache Health Belief Model. Some demographic variables of the migraine population are: age, sex, socio-economic status, personality type, and ethnicity.

Cues to action such as media campaigns or magazine articles that prompt patients to seek care are lacking in migraine headache disorder. This can be attributed partly to the lack of public education programs, physician education programs, and clinic and population based screening programs, recommended by Lipton and Stewart (1993) to reduce the number of untreated migraine sufferers. The Migraine Headache Health Belief

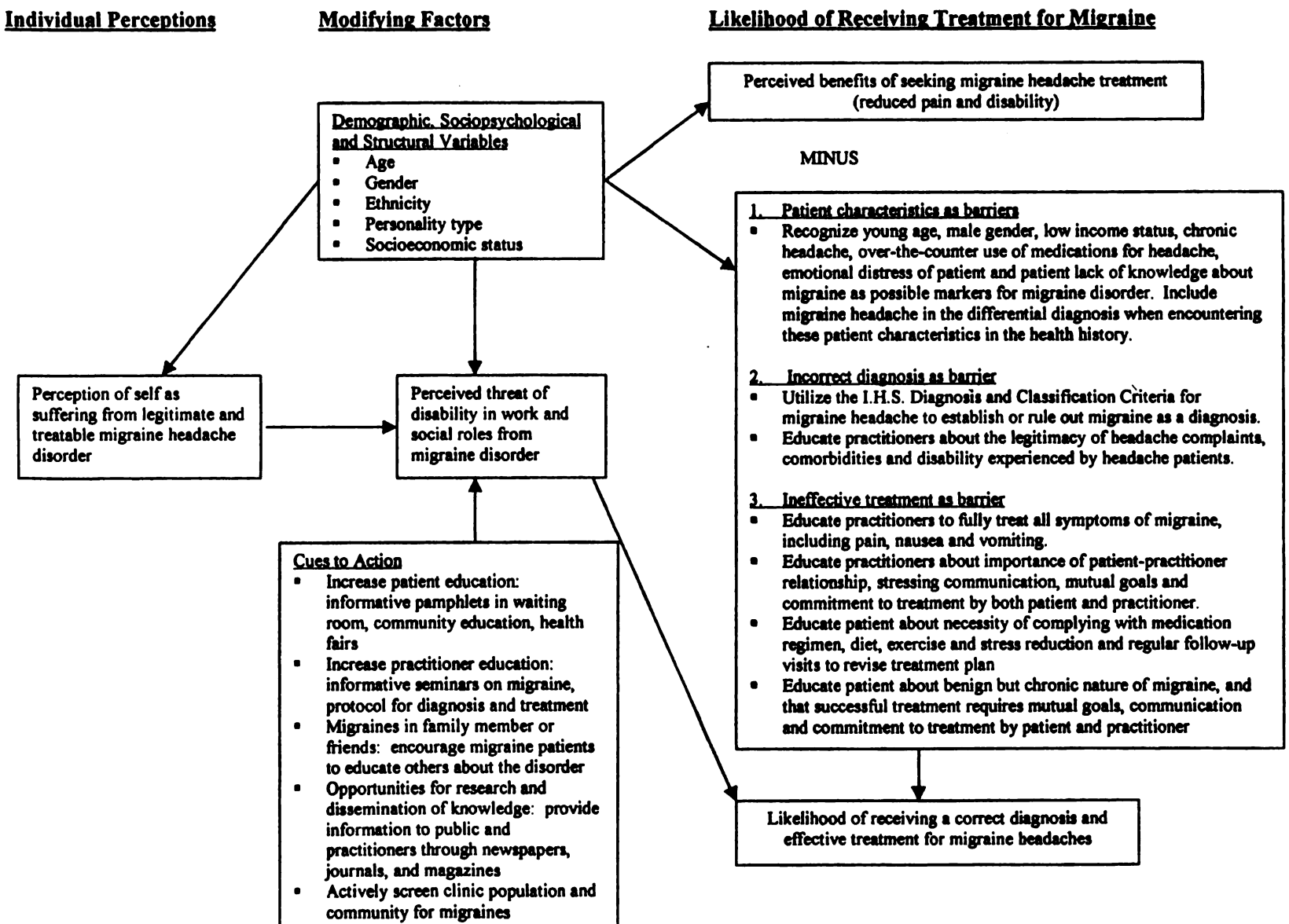
Model identifies specific cues to action that could be helpful in initiating care for migraine patients and in helping to educate practitioners.

The likelihood that a migraine sufferer will seek medical treatment according to the Migraine Headache Health Belief Model depends upon the perceived benefits of seeking medical consultation for headaches minus the barriers, (actual and perceived), to seeking treatment. The model identifies several barriers to migraine diagnosis and treatment, which can be grouped into three categories: patient characteristics, incorrect diagnosis, and ineffective treatment. Patients will be more likely to seek care if these barriers are eliminated.

The Migraine Headache Interventional Health Belief Model

Figure 3 illustrates the Migraine Headache Interventional Health Belief Model. The interventional model illustrates the concepts of the original Health Belief Model and the Migraine Headache Health Belief Model and suggests interventions at each stage of the model to improve diagnosis and treatment of migraine. This model begins with the patient's perception of suffering from a legitimate and treatable headache disorder. This is the result of the APN's intervention of screening patients for migraine and educating about the disorder. In addition, the patient perceives the threat of migraine as increased personal disability in work and social roles. Therefore the failure to consult and receive treatment for migraine headaches would be perceived by the patient to result in increased disability. The modifying variables of age, gender, ethnicity, personality type, socioeconomic status, and prior knowledge of migraine remain unchanged from the previous model.

MIGRAINE HEADACHE INTERVENTIONAL HEALTH BELIEF MODEL



Specific APN interventions to formulate effective cues to action are provided in the Migraine Headache Interventional Health Belief Model. Increasing patient and practitioner education, generation of research, informative articles, and active screening of clinical and community populations are suggested as means to provide the impetus to act upon improving migraine diagnosis and treatment.

The perceived benefits of seeking treatment for migraine headaches in the interventional model are reduction in pain and disability from migraine headache. These benefits are obtained after subtracting the costs of the three levels of barriers. APN interventions for reduction of barriers are detailed for each of the three levels of barriers. To reduce patient characteristics as barriers to treatment, practitioners are advised to recognize young age, male gender, chronic headache, over the counter medication use, emotional distress of the patient, and patient lack of knowledge about migraine as possible markers of migraine headache. The possibility of migraine should be included in the differential diagnosis when encountering these patient characteristics in the health history.

To reduce incorrect diagnosis as a barrier to migraine headache treatment the APN should use the IHS criteria for migraine headache to establish or rule out migraine as a diagnosis. In addition, APNs should educate other practitioners about the legitimacy of headache complaints, as well as comorbidities, and disability experienced by headache patients.

Ineffective treatment as a barrier can be reduced by recognizing the importance of the patient/practitioner relationship to successful migraine treatment. The APN should stress communication, mutuality, and commitment to the treatment regimen and should

emphasize this to patients. Patients should be educated about the chronic but benign nature of migraine, and that successful treatment depends upon compliance with the medication and treatment regimen.

PROTOCOL FOR ASSESSMENT OF MIGRAINE HEADACHE

Introduction

The protocol for the accurate assessment of migraine headache includes the IHS diagnostic criteria for headache disorders, general information on migraine headache disorder, brief descriptions of selected interventions, a headache diary, a general medical information form, and a questionnaire instrument for evaluation of headache and associated symptoms. In addition, the protocol provides information on eliciting a detailed headache history and provides specific instructions for the physical examination, including guidelines for diagnostic and laboratory tests and specification of which patients need physician or specialist referrals. Patient counseling and teaching, goals of treatment, and outcome measurement will be included.

The protocol will recommend APN teaching and counseling about diet and lifestyle interventions and will briefly address pharmcologic and non-pharmcologic treatments; however, treatment of migraine headaches with specific medications is not in the scope of this project and will not be addressed.

Appropriate Patient Population for APN Headache Assessment

The APN in family practice will see all age groups of patients in varying states of health. It is important for APN's to recognize which patients are appropriate for assessment and treatment, which patients require referral to physicians or physician specialists, and which patients require immediate physician attention.

All patients who present with a chief complaint of headache should be screened using the Protocol for Assessment of Migraine Headache. The APN should use the headache history, health history, and physical examination to establish a headache diagnosis. Patients whose health history and review of systems suggest headache disorder and possible barriers to headache treatment should be screened as well. The headache history, health history, and physical exam will begin to differentiate the patients with primary headache disorders such as migraine, tension, and cluster headache from the patients suffering from secondary headache disorders caused by a structural lesion.

APNs working in specialized headache clinics are adept at treating all of the primary headache disorders with pharmcologic and non-pharmcologic treatments. Family practice APNs can treat young healthy adult patients with clear-cut histories suggestive of migraine or tension headache using selected pharmcologic interventions, such as simple analgesics and anti-emetics. Family practice APNs should feel comfortable using all non-pharmcologic interventions such as diet, counseling, education, stress reduction, and other lifestyle interventions. The APN should consult with a physician when considering referrals for interventions such as acupuncture, physical therapy, chiropractic therapy, nerve blocks, trigger point injections, and transcutaneous electrical nerve stimulation therapies.

Patients under the age of 16, or patients with the onset of a new headache after age 40, should be referred to a physician. Patients with the onset of a new or different headache type, onset of subacute headache that progressively worsens over time, onset of headache with sexual activity, coughing, straining or exertion also should be referred to a physician. In addition, patients with chronic malaise, myalgia and arthralgia require

physician referral. Patients who present to the APN with a complaint of sudden onset of "worst headache of my life," or headache associated with either focal neurological deficit or change in mental status should be referred to an emergency room for immediate work up. Patients with severe headache plus fever and nuchal rigidity, or headache and severe hypertension or papilledema should be seen immediately by a physician or referred to an emergency room. These symptoms suggest secondary headache that may rapidly progress to a life-threatening situation. (See Headache Danger Signs for more information.)

General Information About Headache Disorders

The APN will need to be educated about headache disorders in general to be able to make specific headache diagnoses. The following information is an overview of primary and secondary headache disorders with a specific focus on migraine headache.

Primary headache

Primary headaches are formally divided into 3 types: migraine, cluster, and tension headaches. They have characteristic features which distinguish them from secondary headaches, most notably lack of an organic disorder or structural lesion to explain the disorder (Olesen, 1994). Although primary headache is the most common form of headache, the etiology of this disorder remains poorly understood.

Secondary headache

Secondary headaches are attributed to an underlying structural lesion or can be traced to an organic cause. Secondary headaches lack in characteristic features, and exact mechanisms whereby organic causes produce headache are often unknown. Secondary headaches fall into the following ten categories:

1. Headache associated with head trauma
2. Miscellaneous headaches not associated with structural lesions (idiopathic stabbing headache, exertional headache, and headache associated with sexual activity)
3. Vascular disorders and associated headache (ischemic stroke, hemorrhage, and arteritis)
4. Headache associated with non-vascular intracranial disorders such as neoplasm or space occupying lesion
5. Headache associated with the use of substances or their withdrawal
6. Headache associated with noncephalic infection (diffuse viral or bacterial infection)
7. Headache associated with metabolic disorders, such as hypoxia and hypoglycemia
8. Headache associated with facial pain and disorder of the cranium, neck, eyes, ears, nose, sinuses, teeth, mouth, and other facial or cranial structures, such as TMJ dysfunction, sinusitis, and glaucoma
9. Cranial neuralgia
10. Non-classifiable headache (Rapoport & Sheftell, 1996).

Migraine

Migraine is a common headache disorder characterized by combinations of neurologic, gastrointestinal, and autonomic symptoms (Silberstein, 1994). Migraine is characterized by episodic head pain, nausea and vomiting, which can be severe and debilitating. Migraine episodes have five phases: the prodrome, aura, headache, headache termination, and postdrome (Saper, 1997). Not all five phases are present in every migraine sufferer, and presence of some or all of the phases varies from headache to headache for some sufferers. Migraine attacks commonly last from 4 to 72 hours. The

most common forms of migraine fall into two classifications: migraine with aura, and migraine without aura. Migraine occurs more often in women than in men.

Migraine without aura

The headache of migraine is the most uncomfortable phase of migraine headache syndrome, according to Rapoport and Sheftell (1996), who report that migraine has been called "angina of the soul", and "a biological reprimand" for those whose headaches are precipitated by overextending ones self. Migraine headaches are often unilateral, but can be bilateral. The pain is usually throbbing or pulsating in nature, but can be perceived as steady and squeezing as well. The pain can move around to different locations during the attack, or from one attack to another. The pain from migraine ranges from mild to very severe, and can vary during the attack or from one attack to another. Many migraineurs have the headache in the same location for every attack (Blau, 1990).

The headache tends to develop slowly, often taking several hours to reach peak intensity, and lasts from 4 to 72 hours. Migraine headaches tend to be worsened with normal activity such as moving the head or eyes, bending over, and climbing stairs. Migraine headache is frequently accompanied by photophobia, phonophobia, nausea and vomiting, constipation, or diarrhea. Some migraineurs cannot stand to be touched during an attack, (haptophobia). Migraine patients are often very pale during attacks, with characteristic coolness of the extremities, and may have dark circles around the eyes or sunken appearing eyes (Blau, 1990).

Migraine with aura

Migraine with aura differs from migraine without aura only in the presence of focal visual, motor, or sensory neurological symptoms that warn the patient that a

headache is about to occur. Migrainous aura is experienced by only 20% of migraine patients. The aura evolves over a 5 to 20 minute time period but can last as long as an hour. The headache usually follows the aura within 5 to 20 minutes but can take up to an hour to begin. Occasionally the aura and the headache occur at the same time, or the patient may experience the aura and then no headache at all.

Visual auras are described as: scotomas (formed or unformed figures), fortification scotomas (zigzagging or scintillating figures that resemble the jagged barrier around a fort), photopsia (unformed flashes of light, and distorted perception of the shape and size of objects). The visual aura migrates slowly across the visual field, and finally disappears. Motor manifestations of auras include hemiparesis and aphasia and are attributed to brainstem disturbances. Other aura symptoms attributed to the brainstem include ataxia, reduced level of consciousness, diplopia, tinnitus, hearing loss, vertigo, and dysarthria. Sensory auras are perceived as hypersensitivity to feel and touch, parasthesias such as tingling ascending from the hand, up the arm, to the face, and reduced sensation, numbness or hypoesthesia (Saper, 1997).

Other migraine variants

The practitioner may occasionally encounter migraine headache disorders that do not fulfill the IHS criteria for migraine or migraine with aura. These headache syndromes follow migraine with and without aura on the IHS Classification of Headache and are as follows: ophthalmoplegic migraine, retinal migraine, childhood periodic syndromes that might be precursors of migraine, complications of migraine, and migrainous disorder not fulfilling the above criteria. It is the recommendation of this author that any of these migraine variants encountered by the primary care practitioner be referred to a physician

specialist for a complete neurological workup. Some of these migraine variants may difficult to differentiate from secondary headache disorders and further diagnostic testing may be necessary.

Ophthalmoplegic migraine presents with a paralysis of the third, fourth, or sixth cranial nerve. Most commonly the third cranial nerve is affected and manifests as a third nerve paresis with a dilated pupil on one side, ptosis, and difficulty moving the eye up, medially, or down. Retinal migraine is a rare disorder that presents as sudden reversible monocular scotoma or blindness lasting less than one hour. This condition may be a true emergency, as prolonged spasm of the retinal artery can lead to ischemia and blindness, especially if the episodes are frequent or prolonged. Complications of migraine involve stroke-like symptoms such as hemisensory and hemimotor defects. These neurological symptoms persist beyond the occurrence of headache and may last days to weeks (Rapporort & Sheftell, 1996).

Childhood periodic syndromes that might be precursors of migraine- Children may have any of the specific symptoms of migraine with and without aura, opthalmoplegic migraine, retinal migraine and basilar migraine. Children may also exhibit abdominal pain, nausea, and vomiting associated with headache and called abdominal migraine (Prensky, 1987). Children may also have symptoms of facial pallor, confusion, dizziness, and vertigo with migraine. Infrequently, children will present with hemiplegia or hemisensory deficits. This form of childhood migraine is often familial and difficult to control (Solomon, 1994). This author recommends that children with suspected migraine syndromes be referred to a pediatrician or neurologist for further evaluation.

Migrainous disorder not fulfilling above criteria describes any unusual headache presentation. Basilar migraine, according to Rapoport and Sheftell (1996), is a headache preceded by aura symptoms that originate either from the brain stem or both occipital lobes. Basilar auras typically consist of bilateral visual symptoms, dysarthria, tinnitis, vertigo, ataxia, diplopia, and decreased level of consciousness. Patients with these symptoms should be referred to a physician specialist for further evaluation.

Phases of migraine

Prodrome -- Forewarning that a headache will occur. This may begin hours to days before the headache and include photophobia, phonophobia, osmophobia, mental and mood changes, peripheral vasoconstriction, fatigue and sluggishness, increased urinary frequency, anorexia, constipation, diarrhea, fluid retention, food cravings, or sometimes just a vague feeling that a headache is about to occur.

Aura -- Focal visual, motor, or sensory neurologic symptoms that evolve over a period of 5-20 minutes and last less than an hour.

Headache-- Migraine head pain is typically unilateral and throbbing in nature but the features can vary. Headache occurs most often in the morning, or is present upon awakening, but can start at any time. Pain tends to develop gradually and plateaus at the moderate to severe level. Headache is frequently accompanied by nausea and vomiting. Pain lasts from 2-72 hours and is exacerbated by activity.

Headache Termination-- During headache termination, pain tapers gradually and eventually disappears.

Postdrome-- After the headache of migraine has resolved, the migraine sufferer often experiences general fatigue, tiredness, listlessness, and a washed-out feeling. Scalp

tenderness, aching muscles, food craving, or anorexia may occur. Mood alterations such as euphoria or depression may sometimes occur (Saper, 1997).

Migraine triggers

Migraine headache sufferers have a biologically determined migraine threshold, which may be exceeded by a myriad of internal and external environmental factors called triggers. When the headache threshold is exceeded, migraine and the associated manifestations develop. Rapoport and Sheftell (1996) liken triggers to a stick of dynamite with detonators. The stick of dynamite represents the inherited physiological dysfunction that produces biological vulnerability. The detonators are the triggers, any one of which, singly or in combination with others, can set off the explosion.

Common migraine triggers include: hormonal fluctuation, menopause, certain foods, beverages such as tea or alcohol, food additives and preservatives such as MSG and nitrates, caffeine, change in external environment, (weather changes, moving, vacation), changes in internal environment such as infection or metabolic changes, stress or stressful events, sensory stimuli such as bright or flickering lights, odors of perfumes, exhaust or cleaning chemicals, physical exertion, and certain medications.

Pharmacologic treatments

The pharmacologic treatment of migraine generally follows three strategies: (1) preventive or prophylactic, (2) abortive, and symptomatic and, (3) rescue or symptomatic relief, which is the last option when the first two strategies fail. Pharmacologic agents include simple analgesics, combination analgesics, anti-emetics, NSAIDs, ergot derivatives, DHE, sumatriptin, phenothiazines, corticosteroids, narcotic analgesics, Q-blockers, calcium channel blockers, tricylic anti-depressants, anticonvulsants, serotonin

antagonists, beta blockers, and MAO inhibitors. Unless the APN specializes in neuroscience and headache treatment, he/she should refer patients who require pharmacologic treatment beyond simple analgesics and anti-emetics to a physician for further treatment.

Non-pharmacologic treatments

Several non-pharmacologic interventions are used with and without pharmacologic agents in the treatment of migraine. Treatments include: heat application, ice application, biofeedback therapy, yoga, myofascial release therapy, cognitive therapy, exercise, nutritional counseling, stress management techniques, acupuncture, physical therapy, chiropractic therapy, osteopathic manipulative therapy, massage therapy, and occasionally nerve blocks, trigger point injections, and transcutaneus electrical nerve stimulation.

Stress management, exercise, and nutritional counseling are very effective interventions that are helpful to most migraine patients and can be easily incorporated into APN teaching and counseling protocols. Many patients have found biofeedback therapy and yoga to be helpful in reducing number and severity of headaches. Treatments such as nerve blocks, trigger point injections, and transcutaneous electrical nerve stimulation are more controversial and referrals for their use should only be provided by headache specialists and neurologists.

Diet interventions

There are several diets used by migraine sufferers with varying levels of success. Most of these stress avoiding certain foods known to precipitate headache in migraine sufferers. Migraineurs are advised to avoid cheese, dairy products, wheat products, corn, eggs, soybeans, chocolate, alcoholic beverages, especially red wine, and caffeinated

beverages such as coffee, tea and cola (Kennedy & Barter, 1994). Many of these foods contain vasoactive substances such as phenylethylamine, and various nitrates that can precipitate migraine in some patients. Rapoport and Sheftell (1996) state that this type of elimination diet will not help the majority of migraineurs; however, a substantial number of patients have valid food triggers, so they still use diet interventions in their treatment of migraine.

Lifestyle interventions

A balanced lifestyle promoting good health and wellness is often helpful for migraine headache sufferers. Migraineurs should reduce stress in their home, work, and social lives as much as possible. Kennedy and Barter (1994) recommend adequate rest, relaxation, laughter, a nourishing diet, and socialization with friends and family to ameliorate migraine headache frequency and severity. Other helpful interventions include: regular exercise, cessation of smoking, and avoidance of irregular sleep and meal patterns.

Vitamins and herbs

Several studies have indicated that deficiencies of B-vitamins, calcium, vitamin D and magnesium may contribute to migraine frequency and severity. Thys-Jacobs (1994) suggested that deficiencies of vitamin D and calcium in women may trigger the vasomotor instability and vasospasm clinically manifested as migraine, and that supplementing these may bring about symptomatic relief. Other researchers have documented low levels of magnesium in brain tissues of migraine sufferers during an attack and believe that magnesium could be the link between the physiological threshold for migraine attack and the mechanisms of the attack itself (Ramadan & associates,

1989). Rapoport and Sheftell (1996) believe the use of vitamin B-6, B-2 (riboflavin), and vitamin E are helpful for some patients.

In addition, various herbal remedies are thought to have a positive effect on migraine treatment. Feverfew, garlic, ginger, and ginseng have been reported to be helpful in treating migraine; although scientific studies of the effectiveness of herbal remedies are needed (Rapoport & Sheftell, 1996).

The Headache Consultation

The patient requesting an appointment for consultation for headaches should be informed that a proper evaluation for headache will require approximately one hour for the examination and interview. It is time saving to ask the patient to arrive 15 minutes prior to the appointment to fill out the General Medical Information Form and the Headache Questionnaire.

The General Medical Information Form, Headache Questionnaire, and Headache Diary used in this protocol were written by, and used with permission from, Dr. Edmund Messina, a neurologist and headache specialist in Lansing, Michigan. Dr. Messina and the nurse practitioner in his practice use these forms to screen headache patients for pre-existing medical problems and conditions comorbid with headache disorders, to aid in establishing a headache diagnosis, and to help patients track their own headaches.

The General Medical Information Form

The General Medical Information Form gathers information about the patient's age, marital status, occupation, and right or left handedness. The form specifically elicits a chief complaint and date of onset of symptoms. The form inquires about accidents, seatbelt use, and whether or not the patient has been seen in the Emergency Room for the

problem. The form also requires a medical and surgical history and contains a review of systems. Family history and habit history are reviewed as well as diet and sleep patterns. The form inquires about previous CT scans, MRI studies, EEG and EMG studies, myelograms, other x-rays and recent blood work (see Appendix A, General Medical Information Form).

The Headache Questionnaire

The Headache Questionnaire asks specifically how many headache types the patient has. Many patients with headaches have more than one type. The patient is asked to describe each type of headache in detail and apply a subjective rating of intensity of pain for each. The pain scale used starts at level one, a low level pain of which the patient is aware but not requiring treatment, and ends at level five, intense pain rendering the patient unable to function at all (see Appendix B, Headache Questionnaire).

The Headache Questionnaire elicits location on the patient's head and times the headache is present. Women are asked to supply information about their headaches in relation to their menstrual cycle and headache triggers are reviewed. The questionnaire asks what makes the headaches worse or better and inquires about symptoms associated with the headache. In addition a family headache history, a brief disability rating, patient support systems, and previous headache medication use are reviewed.

The Headache Diary

The headache diary is for patients to use in tracking their headache patterns. This form has the date, duration in hours, pain intensity rating using the previously mentioned one through five pain scale, triggers, relieving factors, and relationship to menses. The form is useful in helping practitioners and patients identify triggers, provide information

about other factors in the patient's headache, and revise the treatment plan (see Appendix C, Headache Diary).

History

A complete and accurate history is the most important element of the headache consultation. The practitioner should take advantage of this opportunity to screen the headache patient for barriers to treatment such as specific patient related barriers, past practitioner-related barriers and previous incorrect diagnosis and ineffective treatment barriers. A thorough headache is the cornerstone of headache diagnosis. A good family history is very helpful since approximately 70% of migraine headache patients have a family history positive for headache disorder as well as depression, sleep disturbances, alcoholism, and other illnesses associated with serotonin metabolism (Cady, 1994). A thorough headache history should elicit the following information:

1. Age of onset and description of early headaches
2. Frequency of previous and current headaches, gradual or sudden onset
3. Location of pain
4. Description of the pain
5. Duration of the pain
6. Description of the prodrome
7. Description of the aura, if any
8. Associated symptoms
9. Types of behavior during the headache
10. Headache triggers
11. Past headache medications, prescription, and over the counter medications

12. Current medications (for both headache and any other conditions)

13. Allergies to medications

14. Past medical history

15. Past surgical history

16. Family history (including headache)

17. Habit history, sleep, alcohol, drugs, caffeine, cigarette smoking

18. Age at menarche, menopause, reproductive history, contraceptive or estrogen use

19. Psychosocial history (Rapoport & Sheftell, 1996).

20. Headache treatment barriers

    a. male gender,

    b. low income status

    c. chronic headache

    d. young age

    e. over-the-counter medication use

    f. emotional distress

    g. lack of knowledge about migraine headache disorder

    h. previous incorrect headache diagnosis

    i. previous practitioner bias

    j. previous practitioner failure to treat all migraine symptoms

    k. problems with previous practitioner-patient relationship

    l. patient difficulty with treatment regimen or follow-up schedule

In addition to the above aspects of the history, the following pain assessment questions should be useful in generating a very thorough description of the patient's headaches.

1. How long have you had this pain?
2. How often does this pain occur?
3. Where does the pain begin?
4. Does the pain move around?
5. Is the pain a deep pain, like an ache, or near the surface?
6. What brings on the attacks?
7. What increases the pain or makes it worse?
8. What relieves the pain?
9. What is the pain like?
10. How bad is the pain in terms of affecting daily activities? (Blau, 1990)

The practitioner should obtain a complete review of systems and inquire about history of previous practitioner consultations for treatment of headaches. Medical records including the dates and results of previous neuroimaging studies should be obtained. It is always helpful to ask why the patient is seeking medical attention. Some patients simply want reassurance that they do not have a serious cause for their headaches, such as brain tumor or aneurysm (Capobianco, Cheshire, & Campbell, 1996). In addition the expectations of the patient regarding the consultation can be disclosed, aiding the APN in providing care that meets with the patient's satisfaction.

Information from the history and review of systems is invaluable in establishing a diagnosis. Particular attention should be paid to the following areas of Rapoport and Sheftell's (1996) headache history when the APN suspects migraine headache.

The age of onset is important in the diagnosis of migraine because it establishes whether the headaches are of recent origin, have been present for years, or have changed in quality, intensity or location. These are often clues to the presence of organic pathology. Migraine onset is usually between ages 6 and 25. Migraine prevalence is equal among females and males until puberty, when it becomes 3 times more common in females. Headaches that have been present for years are likely to be benign primary headaches such as migraine, which have no underlying pathology. Headaches that begin abruptly after age 40 or 50 may be caused by underlying disease or dangerous pathology (see Headache Warning Signs, below).

The location of pain in migraine is variable but often occurs in or behind the eye or in the frontotemporal area. The pain can be unilateral or bilateral or may be holocranial. Many migraine patients have pain that switches from one side to the other, from one episode to the next. Migraine pain is usually described as throbbing or pounding, often in cadence with the pulse. Migraine pain can be experienced as an intense squeezing or pressure inside the head. Migraine headaches typically last from 4 to 72 hours. Patients suffering migraine with aura typically experience headaches that last fewer than 12 hours.

Symptoms associated with migraine include: nausea, vomiting, diarrhea, dizziness, cold and pale extremities, sensitivity to light and sound, slightly confused thinking, and worsening of pain with activity. Because any activity tends to exacerbate

the pain and nausea of migraine headache, patients experiencing attacks usually retreat to a quiet, dark room and try to sleep. Inquiring about what the patient does during headache attacks provides important clues in diagnosing migraine.

The habit history is important in the migraine patient because smoking, alcohol, and excess caffeine can exacerbate headaches. The menstrual and hormonal history is important in female migraineurs because headaches often occur in specific stages of the menstrual cycle. In perimenopausal and postmenopausal, women the type and manner of estrogen replacement can effect headaches. The patient's psychosocial history can reveal the presence of comorbid anxiety and depressive disorders which must be taken into account when planning therapy for the migraine patient (Rapoport & Shefftell, 1996).

The APN should be alert for specific characteristics of patients that have been identified as barriers to treatment, such as male gender, young age, low income status, symptom profile, and use of over the counter medications. The patient should be questioned about past headache diagnoses and treatments as these have been shown to constitute barriers to effective diagnosis and treatment of migraine. Awareness of these barriers can enable the APN to provide more effective treatment and increase patient compliance.

Headache Danger Signs

Headache can occasionally herald a catastrophic or life threatening illness such as meningitis or subarachnoid hemorrhage from a leaking aneurysm. It is essential that the practitioner exercise appropriate care in evaluating headache patients. No single sign or symptom differentiates benign headache disorders from serious illness involving

headache as a symptom. If the practitioner encounters any of the following danger signs, referral to a physician or specialist and diagnostic studies are necessary (Cady, 1994a).

Patients complaining of sudden onset of "worst headache of my life", headache associated with change in neurological status or positive findings on a neurological exam, or headache associated with fever or neck pain should be referred to an Emergency Room. Patients with headache and elevated blood pressure should be seen immediately by a physician and possibly referred to an Emergency Room for treatment.

1. Onset of headache after age 40.
2. Onset of new or different headache
3. "Worst headache of my life"
4. Onset of subacute headache that progressively worsens over time
5. Onset of headache with exertion, sexual activity, coughing, or straining
6. Headache associated with change in neurological status such as:
    A. Drowsiness, confusion, memory impairment
    B. Weakness, ataxia, loss of coordination
    C. Sensory loss associated with headache
    D. Unequal pupils, asymmetrical deep tendon response, or Babinski response
    E. Signs of meningeal irritation (neck pain and stiffness, photophobia)
    F. Visual changes
7. Abnormal medical evaluation
    A. Fever
    B. Hypertension

C. Chronic malaise, myalgia, arthralgia

D. Weight loss

E. Tender, poorly pulsatile temporal arteries

F. Papilledema (Cady, 1994).

Rapoport and Sheftell (1996) further advise that headaches accompanied by generalized illness, nausea and fever, or headache accompanied by personality changes or decrease in higher intellectual functioning constitute 'red flags' in the history that necessitate careful evaluation to rule out sinister causes. If headache pain is severe, escalates rapidly, and reaches a peak within five minutes it is more likely to be due to a more serious organic cause than benign primary headaches such as migraine. Any of these symptoms require an immediate physician or specialist consult.

Diagnostic and Laboratory Tests

Young, healthy patients with a clear-cut history suggestive of migraine may not need further work-up according to Rapoport and Sheftell (1996); however, a first attack of what appears to be migraine should probably be investigated. Patients with migraine with aura, complicated migraine, tension type headache, slowly worsening headache symptoms, unilateral headache associated with neurologic symptoms, unusual headaches, basilar artery migraine, or other significant neurological history should have further work-up. Patients with any of the Headache Danger Signs or changing headaches should have a work-up.

Commonly performed diagnostic studies for headache evaluation are computed tomography (CT scan), magnetic resonance imaging (MRI), magnetic resonance angiogram (MRA), and blood tests. Less commonly used are cerebral angiography,

cranial x-rays, radionuclide slides, thermography, electroencephalography (EEG), lumbar puncture, trans cranial doppler and evoked potentials.

CT and MRI

Neuroimaging is usually unnecessary in the routine work-up of typical migraine (Capobianco, Cheshire, & Campbell, 1996). However, if the patient presents with signs and symptoms of increased intracranial pressure or acute neurological deficits CT or MRI may be necessary. CT scans are useful in detecting subarachnoid hemorrhage, subdural hemorrhage, or lesions large enough to produce increased intracranial pressure, and hydrocephalus. CT scan using contrast can reveal arterio-venous malformations, tumors and other lesions (Rapoport & Shefftell, 1996). MRI provides much better soft tissue contrast than CT and can be used to diagnose smaller lesions of the brain stem and cerebellum. MRI can be performed in conjunction with MR angiogram if vascular lesions such as aneurysm are suspected (Smith, 1994).

CT scans are especially useful in the emergency evaluation of subarachnoid, subdural, or other focal hemorrhage. MRI is better for evaluation of chronic headache conditions and suspected posterior fossa lesions (Rapoport & Sheftell, 1996). CT and MRI are very expensive, and the primary care practitioner must be prepared to order them only when necessary, but to always know when they are necessary. The following information is useful in ascertaining the need for CT or MRI in the primary care setting (Smith, 1994).

CT or MRI is indicated when any of the following are present:

1. Unaccountable abnormality in vital signs
2. Decreased alertness or cognition

3. Onset with exertion

4. Worsening under observation

5. Nuchal rigidity

6. Focal neurological signs

7. First headache in patient over 50 years

8. "Worst headache of my life"

9. Initial evaluation of patient with suspected migraine with aura or basilar migraine

CT or MRI is not indicated when all of the following are present:

1. Previous identical headache

2. Normal vital signs

3. Alertness and cognition intact

4. Supple neck

5. No neurological signs

6. Improvement in headache without analgesic or abortive medications (Smith, 1994).

Blood tests

A complete blood count, general chemistry profile, erythrocyte sedimentation rate, thyroid stimulating hormone, and Lyme disease titer are all indicated in the work-up of the headache patient. The CBC can reveal blood dyscrasias from medications, infectious disease, and more serious hematological conditions that may account for headache. Chronic anemia may be associated with underlying malignancy, collagen

vascular disease, blood loss from medication usage, or other chronic illness and requires investigation (Cady, 1994a).

The chemistry profile can reveal serious reactions to medications evident in alterations in liver enzymes and other values. In addition, hidden medical conditions such as hepatitis and renal dysfunction can be discovered. The ESR can be used to help rule out temporal or giant cell arteritis and other vasculopathies and inflammatory conditions. The ESR may be elevated by systemic infections, inflammatory conditions, collagen vascular disease, occult malignancies, and multiple myeloma (Cady, 1994a). A TSH should be done to rule out thyroid dysfunction as a cause of headache, and a Lyme titer should be drawn in areas where the disease occurs (Rapoport & Sheftell, 1996).

Cerebral angiography

Cerebral angiography should be considered when attempting to rule out vascular abnormalities such as aneurysms, cerebral arteritis, carotid artery stenosis, dissections or occlusions, and arteriovenous malformations. Cerebral angiography is not indicated in the routine work-up of migraine patients. Patients with migraine should not have direct carotid artery punctures for angiography because intra-arterial injections of contrast material into the blood vessels that lead to the migraine patient's brain could cause vasospasm and transient ischemic attack (Rapoport & Sheftell, 1996). Embolic or ischemic stroke is a rare but possible side effect of cerebral angiography and it should be used only when absolutely necessary. Magnetic resonance angiography, although not as accurate as cerebral angiography, is very effective in ruling out most vascular abnormalities if needed in the migraine patient.

Radionuclide scans, Spect and Pet scans, and evoked potentials

Radionuclide scans are rarely performed today because MRI can readily provide more accurate information. SPECT, (single photon emission computed tomography), and PET, (positron emission tomography), scans are still experimental in the evaluation of migraine. Evoked potentials are useful in detecting a number of neurologic conditions such as multiple sclerosis. Evoked potentials can be abnormal in migraine patients suggesting excitability of the cortex. Evoked potentials are not useful in the routine work-up of migraine unless other neurological conditions are suspected (Rapoport & Sheftell, 1996).

Cranial X-rays

Skull x-rays are rarely helpful in the work-up of migraine headaches. Sinus x-rays can be useful in differentiating migraine from facial pain due to sinusitis. Cervical spine x-rays are helpful in diagnosing arthritis and fracture which may cause cervicogenic headache, but they are not useful in diagnosing disc disease (Rapoport & Sheftell, 1996).

Electroencephalography

According to Capobianco, Cheshire, and Campbell (1996) electroencephalography or EEG has no place in the routine work-up of migraine headache. Many abnormalities have been discovered in the EEG readings of migraine patients in the past but neurologists rarely find the information helpful or agree on the interpretations of the findings. EEG should be ordered for migraine patients only if there is a history or suspicion of seizures, head trauma, loss of consciousness, or presyncope.

Thermography

The use of thermography in the evaluation of migraine headache has demonstrated significant abnormalities in the temperature patterns of the heads and faces of migraine patients. These results are interesting from a research point of view but do little more than establish a temperature pattern consistent with migraine headaches. According to Rapoport & Sheftell (1996), the thermograms provide graphic evidence of altered physiology and help migraineurs to realize that the headaches are not all in their minds. It is the opinion of this author that thermography is not cost effective or useful in the work-up of migraine headaches.

Transcranial doppler

Transcranial doppler studies have demonstrated abnormal findings in migraine patients. They are useful in the work-up of intracranial vascular conditions such as vasospasm associated with ruptured aneurysm, but are not useful or cost effective in the work-up of routine migraine.

Lumbar puncture

Lumbar puncture is not performed in the routine work-up of migraine headache. In cases of suspected subarachnoid hemorrhage, whether visible on CT scan or not, lumbar puncture can establish the presence of blood in the cerebro-spinal-fluid, and measure elevations in the opening pressure, indicating possible subarachnoid hemorrhage or hydrocephalus. This may indicate the need for cerebral angiography, MRI, MRA, or other diagnostic testing (Capobianco, Cheshire, & Campbell, 1996). Lumbar puncture establishes the diagnosis of meningitis or other central nervous system infection as well. Spinal fluid should be analyzed for cells, protein, glucose, VDRL, and antigens. Cultures

of the spinal fluid should be started. Lumbar puncture is contraindicated in the presence of papilledema.

The Physical Exam

A complete physical and neurological exam including vital signs should be performed on the headache patient to rule out the possibility of secondary headache, (headache from an underlying pathological condition), and to ascertain the general health status of the individual. The general physical exam is important in ruling out comorbid conditions or factors that may contribute to headache such as hypertension, thyroid dysfunction, pulmonary disease, cardiovascular disease, or gastrointestinal disturbance.

Medications taken for headache by migraine patients can be associated with systemic effects and the practitioner should be alert for evidence of this. Beta-blockers may cause wheezing or bradycardia, and overuse of ergotamines may cause decreased pulses, myalgia, stomach pain, and nausea. Migraineurs who overuse narcotics or butalbitol products may exhibit cerebellar ataxia, impaired concentration, sedation, and depression. Patients withdrawing from benzodiazapines or barbiturates may have increased irritability, dilated pupils, hyperreflexia, tremors, and piloerection.

The physical exam begins with the general presentation. The practitioner should note an appearance of pain, fatigue, sadness, anxiety, pressured speech, or restlessness. Also important is the patient's response to the practitioner. Does the patient make eye contact? Does the patient's affect appear appropriate? Is the patient defensive or open to inquiries? Along with a complete general physical examination the practitioner should perform the following examinations (Rapoport & Sheftell, 1996).

Head and neck

Cranium- Observe shape, size, deformities, lumps, bumps, and scars. Palpate for pericranial tenderness and excessive tightening of muscles.

Eyes- Check for ptosis, exophthalmos, conjunctival injection, and strabismus. Apply gentle pressure to the orbits to check for increased intraocular pressure and tenderness associated with glaucoma. Auscultate the orbits with the bell of the stethoscope for bruits.

Musculature- Check for tenderness in the area of the greater and lesser occipital nerves, as well as the musculature of the head, sternocleidomastoid, suprascapular, and infrascapular muscles. Check for range of motion of the neck in all directions. Inability to flex the neck, with stiffness, pain, and fever may be a sign of meningitis or hemorrhage.

Jaws- Palpate and auscultate the temporomandibular joint. Deviation of the jaw on opening, noise in the joint, tenderness on palpation, reduced range of motion, pain with clenching or opening widely, and spasm of the internal pterygoid may indicate temporomandibular joint dysfunction.

Temporal arteries- Observe for prominence and palpate for adequate pulsation, tenderness, and rigidity to rule out temporal arteritis.

Sinuses- Evaluate for sinusitis by palpating the frontal and maxillary sinuses for tenderness and swelling. Use a penlight or otoscope to transilluminate the frontal and maxillary sinuses for cloudiness. Observe for purulent nasal discharge, fever, and redness and swelling of the mucous membranes. Chronic sinusitis only rarely causes chronic

headache but it must be included in the differential diagnosis of patients with any of the above findings.

Carotid, vertebral and subclavian arteries- Palpate and auscultate the extracranial carotid arterial tree, including the external carotid and vertebral arteries, for irregularities, bruits, and rigidity. Auscultate over the temporal bone under the angle of the jaw for the carotid arteries, and at the base of the neck for the subclavian and vertebral arteries. The presence of bruits may indicate arteriovenous malformation, vascular tumor, or vessel disease.

Thyroid- Palpate for thyroid swelling or nodules. Observe for symmetrical or asymmetrical enlargement.

Lymph Nodes- Check for lymphadenopathy which may indicate infection or underlying malignancy.

Cranial nerves- the cranial nerves should be fully and carefully evaluated in the workup of the migraine patient with particular emphasis on the following:

Second cranial nerve- Examination of the cranial nerves, including fundoscopy, is imperative in the work-up of the migraine headache patient. The fundoscopic exam can reveal papilledema and retinal changes from hypertension and diabetes, or may reveal papilledema secondary to increased intracranial pressure from a tumor or other lesion. Check for pupil reaction to light and accommodation.

Third and fourth cranial nerves- Check for visual field deficits and diplopia using finger counting with double simultaneous stimulation, (putting fingers in both fields at once while the patient concentrates on your nose), and check all 6 cardinal gazes.

Deficits in visual field may be present in demyelinating disease, structural pathology, or meningitis.

Fifth cranial nerve- Examine all three sensory divisions of the trigeminal nerve on each side. Check the first division by testing corneal reflex and using light touch and pin prick on the forehead. The second and third divisions are tested by with light touch and pin prick on the jaw and cheek. Check for voluntary and involuntary movement of the muscles supplied by the motor division of the trigeminal nerve by feeling the masseter bulk on clenching.

Seventh cranial nerve- Problems with the seventh (or facial) nerve may present as Bell's Palsy, (paralysis of one entire side of the face). Patients with central lesions involving the face can still smile spontaneously, unlike those with peripheral lesions of the seventh nerve.

Eighth cranial nerve- Check the patient's hearing with light finger rubbing, and by checking both Weber and Rinne responses with a tuning fork.

Ninth cranial nerve- Check the glossopharyngeal nerve by determining if light touch sensation on both sides of the back of the throat is intact. Neuralagia of the ninth nerve is evidenced by pain in the tonsillar area radiating to the ear.

Tenth cranial nerve- Check the gag reflex and note the character of the voice. If the reflex is intact the palate and uvula should rise symmetrically. Difficulties such as hoarseness in the patient's voice may be a result of tenth cranial nerve damage.

Eleventh cranial nerve- weak sternocleidomastoid or trapezius muscles result when the spinal accessory nerve is impaired. Shoulder shrugging and lateral head turning may be affected.

Twelfth cranial nerve- Impairment of the hypogossal nerve may be evidenced by deviation of the tongue, (which points to the side of the lesion). Atrophy or fasiculations of the tongue also suggest twelfth cranial nerve damage.

Sensory systems

Test all modalities using light touch, hot and cold, and vibratory sensation. Compare right to left and distal to proximal. Migraine headache patients' sensations are usually normal upon evaluation. Many migraineurs do demonstrate coolness of the extremities, which is probably due to excessive vasomotor tone resulting in decreased blood flow. Migraineurs may therefore complain of decreased perception of cold distally. During a migraine attack patients often report that their head feels hot and that their hands and feet are ice cold. This is probably because increased blood flow to the extracranial vasculature results in enhanced heat, and decreased flow to the extremities causes coolness.

The motor system

All muscle groups should be checked for tone and strength. Check proximal and distal power in the arms and legs. Evaluate for the presence of tremor at rest, and with action, (intentional tremor). Look for cogwheel rigidity, (stiffness), suggesting Parkinson's disease. Tremors may be signs of medication side effects, demyelinating disease, hyperthyroidism, and anxiety. Tremors may also be benign.

Cerebellar examination

Evaluate the migraine patient's gait and coordination. Perform finger to nose, heel to shin, tandem walking, and Romberg's test. Even without formal testing, simple

observation of the patient's gait and coordination can provide very accurate information about the patient's cerebellar integrity.

Reflexes

Check the deep tendon reflexes including the biceps, brachioradialis, triceps, quadriceps, and Achilles. Check for pathological Babinski's reflexes. Check the pupillary, corneal, and gag reflexes with the cranial nerve exam. Check for Kernig's and Brudzinski's sign, or stiffness of the neck, to rule out meningitis.

Mental status

The history should be helpful in providing clues to the existence of depression or anxiety. Be alert for blunted, sad or inappropriate affect in migraine patients. Check ability to concentrate and recent and remote memory. Evaluate the migraine patient for evidence of rumination or obsessional personality style (Rapoport & Sheftell, 1996).

Rapid Physical Exam to Rule out Secondary Headache

If the practitioner has only a limited time to spend with the headache patient, the following examination falls within the scope of primary care practice and can be carried out within the time usually allotted for a routine visit (Smith, 1994). It is the recommendation of this author that a complete physical be scheduled within the next week or so to more thoroughly examine the patient and review the health history.

Cognitive Status- An alert, coherent patient who is behaving reasonably seldom has impaired cognition. This can be observed easily at the beginning of the examination.

Vital Signs- Take the blood pressure, temperature, pulse and respiratory rate. Any abnormalities in the vital signs require further investigation and the practitioner must consider the possible relationship to the headache complaint.

Neck- Check for nuchal rigidity, as positive Kernig and Brudzinski signs may indicate meningitis. Patients with subarachnoid hemorrhage often complain of neck stiffness and pain.

Cranial Nerves- Examine pupil size and light and accommodation reflexes. Examine fundi and check for nystagmus. Evaluate facial symmetry. Examination of the cranial nerves will help screen for headache related intracranial lesion.

Power- Check deltoids, handgrip, hip movement, flexor and ankle dorsiflection for motor power. Biceps tendon reflexes, knee jerks, and flexor responses should be tested. The finger-nose test should be performed. Observe the patient walking to test gait abnormality. Observe fine and gross motor skills and coordination. Abnormalities in any of the following merit investigation (Smith, 1994).

Diagnosis Using the International Headache Society Criteria

After a careful review of the physical exam and entire headache and medical history a diagnosis using The IHS criteria can be made. When reviewing the IHS criteria for the primary headache disorders it should be clear that the information necessary to make the diagnosis has been included in the history-taking format, (used in this protocol). Table 1 shows the IHS diagnostic criteria for classification of headache.

IHS Classification of headache

The IHS Classification of Headache summarizes all the primary and secondary headache disorders on a single table. As shown in Table 1, the first three groups are the primary headaches, groups five through thirteen are the secondary headaches.

Table 1 . New International Headache Society Classification of Headache

1 Migraine
1.1 Migraine without aura
1.2 Migraine with aura
1.3 Opthalmoplegic migraine
1.4 Retinal migraine
1.5 Childhood periodic syndromes that may be precursors to or
1.6 Complications of migraine
1.7 Migranous disorder not fulfilling above criteria
2. Tension-type headache
2.1 Episodic tension-type headache
2.2 Chronic tension-type headache
2.3 Tension-type headache not fulfilling the above criteria
3. Cluster headache not associated with structural lesion
3.1 Cluster headache
3.2 Chronic paroxysmal hemicrania
3.3 Cluster headache-like disorder not fulfilling the above criteria
4. Miscellaneous headaches not associated with structural lesion
4.1 Idiopathic stabbing headache
4.2 External compression headache
4.3 Cold stimulus headache
4.4 Benign cough headache
4.5 Benign exertional headache
4.6 Headache associated with sexual activity
5. Headache associated with head trauma
5.1 Acute posttraumatic headache
5.2 Chronic posttraumatic headache
6. Headache associated with vascular disorders
6.1 Acute ischemic cerebrovasculor disorder
6.2 Intracranial hematoma
6.3 Subarachnoid hemorrhage
6.4 Unruptured vascular malformation
6.5 Arteritis
6.6 Carotid or vertebral artery pain
6.7 Venous thrombosis
6.8 Arterial hypertension
6.9 Headache associated with other vascular disease

Table 1 continued

7. Headache associated with nonvascular intracranial disorder

7.1 High CSF pressure

7.2 Low CSF pressure

7.3 Intracranial infection

7.4 Intracranial sarcoidosis and other noninfectious inflammatory

7.5 Headache related to intrathecal injections

7.6 Intracranial neoplasm

7.7 Headache associated with intracranial disorder

8. Headache associated with substances or their withdrawal

8.1 Headache induced by acute substance use or exposure

8.2 Headache induced by chronic substance use or exposure

8.3 Headache from substance withdrawal (acute use)

8.4 Headache from substance withdrawal (chronic use)

8.5 Headache associated with substances but with uncertain mechanism

9. Headache associated with noncephalic infection

9.1 Viral infection

9.2 Bacterial infection

9.3 Headache related to other infection

10. Headache associated with metabolic disorder

10.1 Hypoxia

10.2 Hypercapnia

10.3 Mixed hypoxia and hypercapnia

10.4 Hypoglycemia

10.5 Dialysis

10.6 Headache related to other metabolic abnormality

11. Headache or facial pain associated with disorder of cranium, neck, eyes, ears, nose, teeth, mouth or other facial or cranial structures

11.1 Cranial bone

11.2 Neck

11.3 Eyes

11.4 Ears

11.5 Nose and sinuses

11.6 Teeth, jaws and related structures

11.7 Temporomandibular joint disease

Table 1 continued

12. Cranial neuralgias, nerve trunk pain, and deafferentation pain
12.1 Persistent (in contrast to tic-like) pain of cranial nerve origin
12.2 Trigeminal neuralgia
12.3 Glossopharyngral neuralgia
12.4 Nervus intermedius neuralgia
12.5 Superior laryngeal neuralgia
12.6 Occipital neuralgia
12.7 Central causes of head and facial pain other than tic douloureux
12.8 Facial pain not fulfilling the above criteria
13. Headache not classifiable

IHS criteria for migraine without aura

The IHS diagnostic criteria for migraine without aura have very specific inclusive and exclusive criteria that must be met for the diagnosis to be made (see table 2). The IHS criteria specify that a diagnosis of migraine without aura requires at least five attacks of headache lasting four to seventy two hours with at least two of the following: unilateral location, pulsating quality, moderate or severe intensity, and aggravation by routine physical activity. In addition to the above, at least one of the following two is necessary for the diagnosis: nausea and/or vomiting, and photophobia or phonophobia. The IHS criteria also specify that for the diagnosis to be applied there must be no evidence of associated organic or systemic metabolic disease as a cause of the headache.

Table 2. Diagnostic Criteria for Migraine Without Aura

A. At least 5 attacks fulfilling B-D.

B. Headache attacks last 4-72 hours (untreated or successfully treated).

C. Headache has at least two of the following characteristics:

   1. Unilateral location

   2. Pulsating quality

   3. Moderate or severe intensity (inhibits or prohibits daily activities)

   4. Aggravation by walking stairs or similar routine physical activity

D. During headache at least one of the following:

   1. Nausea and/or vomiting

2. Photophobia and/or phonophobia

E. At least one of the following:

1. History and physical and neurological examinations do not suggest one of the disorders listed in groups 5-11 (see above International Headache Society Criteria)

2. History and/or physical and/or neurological examinations do suggest such disorder, but it is ruled out by appropriate investigations

IHS criteria for migraine with aura

According to the IHS criteria for diagnosis of migraine with aura at least two attacks fulfilling three of the following four characteristics must be met: one or more fully reversible aura symptoms indicating focal cerebral cortical and/or brain stem dysfunction, at least one aura symptom develops gradually over more than four minutes or two or more symptoms occur in succession, no aura symptom lasts more than one hour, and the headache follows the aura with a free interval of less than one hour. The exclusion criteria for migraine with aura also specify that no organic or systemic metabolic disease may be present which account for the symptoms (see table 3).

Table 3. Diagnostic Criteria for Migraine With Aura

A. At least 2 attacks fulfilling B.

B. At least 3 of the following 4 characteristics:

1. One or more fully reversible aura symptoms indicating focal, cerebral cortical and/or brain stem function.

2. At least one aura symptom develops gradually over more than 4 minutes or 2 or more symptoms occur in succession.

3. No aura symptom lasts more than 60 minutes. If more than one aura symptom is present, accepted duration is proportionally increased.

4. Headache follows aura with a free interval of less than 60 minutes (it may begin before or simultaneously with the aura).

C. At least one of the following:

1. History and physical and neurological examinations do not suggest one of the disorders listed in groups 5-11.

2. History and/or physical and/or neurological examinations do suggest such disorder, but it is ruled out by appropriate investigations.

3. Such disorder is present, but migraine attacks do not occur for the first time in close temporal relation to the disorder.

IHS Criteria for tension headache

Tension headache is the most common of all of the primary headache disorders. It is more common in women than in men, and can occasionally be severe and disabling. The patient usually reports a long history of headaches associated with fatigue and stress. Depression, anxiety, sleep disturbances, low energy levels, sadness, guilt, difficulty concentrating, irritability, and nervousness are frequently reported by tension headache sufferers.

Patients complain of pain that is usually bilateral, but the pain can be unilateral. The pain is described as a steady, aching pressure, like a band tightening around the patient's head. The pain is experienced in the occipital and upper neck region, as well in

as the frontal and temporal areas. The pain of tension headache varies from mild to moderate and is often progressive, lasting 30 minutes to 7 days. The pain is not aggravated by physical activity, and is not associated with nausea or vomiting. Tension headache pain may produce anorexia (Weiss, 1993). The IHS criteria are helpful in differentiating tension headache from the other primary headache disorders.

Table 4. Diagnostic Criteria for Tension-Type Headache

At least two of the following pain characteristics:

1. Pressing/tightening (nonpulsating) quality
2. Mild or moderate intensity may inhibit but does not prohibit activities)
3. Bilateral location
4. No aggravation by walking stairs or routine physical activity

Both of the following;

1. No nausea or vomiting (anorexia may occur)
2. Photophobia and phonophobia are absent, or one but not the other are present

At least one of the following:

1. History, physical, and neurologic examinations do not suggest headache associated with trauma, vascular or nonvascular disorders, substance use or withdrawal, noncephalic infection, metabolic disorder and disorders of the facial structures
2. History and/or physical and/or neurologic examinations suggest such disorder, but it is ruled out

3. Such disorder is present but tension type headaches do not occur for the first time in close temporal relation to disorder

IHS Criteria for cluster headache

According to Rapoport and Sheftell (1996), cluster headache is among the most painful of all human experiences. Cluster headache has been called suicide headache, because patients with this disorder have been known to consider suicide when treatment measures fail. Cluster headache is four times more common in men than in women.

Rapoport and Sheftell (1996) offer an interesting patient profile commonly observed in cluster patients. The typical cluster patient is a middle-aged male with a busy schedule and much responsibility. Cluster headache patients are often social people, described as "macho" types, who enjoy hunting, fishing, and other sports. They tend to be heavy smokers and often drink alcohol to excess. Cluster men tend to be slightly taller and thinner than average. They are more likely to have hazel eyes with chiseled features, deeply furrowed foreheads, and prominent naso-labial folds. They often present with peau d'orange, (orange peel skin), and telangiectasia of the nose and cheeks. They often have a weather-beaten, lion-like facial appearance called leonine facies, (Rapoport & Sheftell, 1996).

Cluster patients describe episodes of excruciating unilateral pain located behind or around the eye. The pain may radiate to the jaw, nose, cheek, or temple. Cluster headaches last 15 to 180 minutes, and occur in clusters lasting 3 to 16 weeks. They then disappear for a year or more. Clusters are often nocturnal and tend to occur on the same side. Lacrimation, unilatoral rhinorrea, miosis, ptosis, flushing, and edema of the affected side are common.

Table 5. Diagnostic Criteria for Cluster Headache

A. At least 5 attacks fulfilling B-D.

B. Severe unilateral orbital, supraorbital and/or temporal pain lasting 15 to 180 minutes untreated.

C. Headache is associated with at least one of the following signs that have to be present on the pain side.

1 Conjunctival injection

2. Lacrimation

3. Nasal congestion

4. Rhinorrhea

5. Forehead and facial sweating

6. Miosis

7. Ptosis

8. Eyelid edema

D. Frequency of attacks: from 1 every other day to 8 per day.

E. At least one of the following:

1. History and physical and neurological examinations do not suggest one of the disorders listed in groups 5-11.

2. History and/or physical and/or neurological examinations do suggest such disorder, but it is ruled out by appropriate investigations.

3. Such disorder is present, but cluster headache does not occur for the first time in close temporal relation to the disorder.

The headache history, a review of neurologic symptoms, a headache treatment barrier assessment, neurological exam, headache danger signs, and the IHS criteria for diagnosis of migraine, tension-type, and cluster headaches have been incorporated into a one page migraine headache assessment document by this author for facilitation of headache diagnosis (see Appendix D). A pocket protocol card with the migraine headache assessment is also included with this manuscript.

Medical Management of Migraine

Migraine is a highly prevalent, underdiagnosed, and undertreated disease that causes decades of suffering and disability for many patients. It is, according to Cady (1994b), a chronic disease. Management models applied with success to other chronic disease states suggest that early identification and treatment can reduce long-term morbidity. Management of migraine should be divided into five basic components: (1) education, (2) acute treatment strategies, (3) prophylactic strategies, (4) nonpharmacological therapies, and (5) long term follow up. As with all chronic diseases and disorders, education is the cornerstone of management (Cady, 1994b).

Patient Counseling and Teaching

Migraine patients and their practitioners must form a collaborative partnership characterized by open communication and mutual respect. Effective management of headache demands that practitioners reach beyond traditional standards of therapy and understand the medical, psychological, and social issues confronting the patient (Cady, 1994b).

The necessity of a strong patient/practitioner relationship for the successful treatment of migraine cannot be stressed enough. After secondary causes of headache

have been ruled out, and the diagnosis of migraine is made, the majority of the further treatment is directed at: (1) teaching the migraine patient to manage and control symptoms, using nonpharmacologic therapies and strategies, and (2) counseling the patient to assist him/her in making the necessary lifestyle changes and maximizing coping behavior. Counseling and teaching are the key elements in the successful treatment of migraine patients. The remainder of the treatment will consist of establishing a medication regimen for prophylactic and symptomatic control, making modifications as needed, and following up on new or changing headache symptoms.

Headache patients tend to be frequent callers, usually requesting pain medications or acute headache treatment. According to Kennedy and Barter (1994), a quiet, soothing tone and empathetic, informative, open-ended responses are often the most effective interventions when counseling migraineurs. Patients must be believed when they talk about the subjective complaints of migraine. Practitioner skepticism as to the validity of the patient's complaints or descriptions of disability is counterproductive and may produce compliance problems. Educating patients about diagnosis, pathophysiology, and treatment alternatives will maximize compliance (Rapoport & Sheftell, 1996). The following are the major points to be covered when counseling and educating migraine patients (Kennedy & Barter, 1994).

1. Explain that the mechanism of migraine headache is not well understood. Explain to the patient what we do know about the pathophysiology of migraine. Many patients would like a precise answer about the underlying cause of headache, but this remains a mystery. The physiological disturbance may involve a chemical alteration,

vascular changes, or a disturbance in nerve cells, but as yet researchers remain uncertain as to the exact cause.

2. Reinforce to the patient that the goal of therapy is to reduce the severity, frequency, and duration of headaches. In most cases it is not possible to eliminate the headaches completely, but most headache patients can experience significant relief from pain and reduction in disability. It is important that the patient have realistic expectations of medical treatment of migraine headaches.

3. Teach the patient to use the headache calendar so that a more objective assessment of treatment response can be determined. The client should be educated to record each headache, medications used, and their success or their lack of, food consumed before the headache, activities performed before and during the headache, a pain intensity estimate, and length of time for the headache to subside. In addition, the patient should record any other factors, such as life stressors and relationship to menses, that may be related. The headache calendar is helpful in visualizing progress and improvement of the headache disorder.

4. Teach patients that overuse of ergotamines and pain medications may actually exacerbate the headache problems. Patients who overuse analgesics often experience a greatly increased frequency and severity of headaches, with headache pain becoming refractory to pain medication. Patients whose headaches have become refractory to analgesics and ergotamines require a washout period of abstinence from these medications to regulate the nocioceptive system.

5. Encourage the patient to continue preventive medications for several weeks before making an assessment of the drug efficacy. The therapeutic effect of many

prophylactic medications for migraine often takes several weeks to become apparent. Reinforce that patience and hope are important psychological variables in effective migraine treatment.

6. Strongly recommend a balanced lifestyle for good health and wellness. Patients can often control their levels of rest, relaxation, laughter, nourishing diet, socialization with friends and family, work, and exercise patterns. Teach patients that positive changes in any of these areas greatly enhance physical and mental well being, and thereby greatly ameliorate migraine headache disorder.

7. After the workup for migraine reveals no abnormal findings, reassure the patient that the headache is not due to a sinister cause, such as aneurysm or brain tumor (Capobianco, Cheshire & Campbell, 1996). Explain to the patient that they were born with a sensitive neurovascular system that overreacts to internal changes and external stimuli, and that migraine is thought to be an inherited or genetic condition. Explain the pathophysiology of primary headache disorders to patients.

8. Teach the patient about the role of triggers in migraine headache. Advise patients that irregular sleep patterns, missed meals, smoking, certain foods, alcohol use, prolonged overexertion, glare, noise, and odors act as triggers to many migraine patients and should be avoided Capobionco, Cheshire, & Campbell, 1996). Advise the patient to use a headache diary and food diary to discover his or her own particular triggers.

9. Educate the patient about what medications to take when, and why they have been prescribed. Explain how the medications work and their potential side effects. Patients should leave with simple and explicit written instructions and should be encouraged to call with questions or problems (Rapoport & Sheftell, 1996).

10. If laboratory or diagnostic tests are required for the patient, be sure to explain how the results will help you to manage their headaches more efficiently. Describe the testing environment and any preparations required. Patients who are claustrophobic may require small doses of benzodiazapines for MRI studies (Rapoport & Sheftell, 1996).

11. Educate female patients about the role of hormones in migraine headache disorder. Inform patients that migraine often presents at puberty, disappears with pregnancy and may worsen in the peri-menopausal years. Teach that migraine can be exacerbated with hormone replacement or oral contraceptives (Rapoport & Sheftell, 1996).

12. Explain the role of stress and psychological factors. Advise the patient to reduce stress in their personal lives as much as possible and to learn positive strategies for managing unavoidable stress. Patients should be aware that migraine headache is much more likely to occur after stressful times and during letdown times, such as the first few days of vacation and weekends. Some patients with overwhelming problems and responsibilities may require ongoing counseling by the practitioner to learn to manage stress more effectively (Rapoport & Sheftell, 1996).

Follow-Up Schedule

The migraine patient should be scheduled to return for follow-up as soon as possible after the completion of the history and physical examination and any diagnostic workup. The practitioner should schedule up to an hour to explain the diagnosis and begin teaching about pharmacologic and non-pharmacologic interventions and lifestyle modifications that the patient will need to undertake. The patient should be encouraged

to call the practitioner if they have questions or concerns. The patient should return for a thirty-minute visit in two weeks to evaluate progress with the medical regimen and continue counseling and education.

Depending upon the extent of headache related disability and success of the treatment plan, the patient should be rescheduled to return at bi-weekly or monthly intervals. Patients who are doing well may not need to be seen for three or six months. All patients will need to return at least every six months for evaluation of possible side effects of medication. Some migraine medications can produce hepatic or renal problems or cause blood dyscrasias. As always, patients should be encouraged to call the practitioner with problems or concerns.

Goals of Treatment

The goals of treatment in migraine are greater control of headaches, decreased frequency of headaches, and enhanced quality of life (Rapoport & Sheftell, 1996). Reduced pain and disability are the results of successful treatment. It is important that the patient and practitioner have mutual goals in the treatment of migraine headache disorder.

Outcome Measurement

The effectiveness of treatment in migraine headache management is likely to take weeks to months to appreciate. An important tool for evaluating outcomes is the patient's headache diary, which should be reviewed at each visit to evaluate effectiveness of individual interventions in diet, exercise, stress reduction, and pharmacologic and nonpharmocologic therapies. Outcomes can be measured in reduction of headache

frequency, severity, and duration. Reduction in occurrence of associated symptoms such as aura and nausea and vomiting are important parameters as well.

The practitioner should keep detailed notes on the telephone and office counseling sessions to evaluate outcomes. Patients' subjective estimates of the progress of their headache treatments are helpful in appreciating improvement or worsening of their conditions. Document the patient's comments such as "I had only two headaches this month instead of the two headaches each week I usually get."

Another measure of outcomes is the patient's use of medications. Patients who are improving as a result of lifestyle interventions, counseling, and nonpharmocologic therapies will require fewer prescription and over the counter medications. Again, careful documentation on the part of the practitioner concerning medication use is of paramount importance in measuring outcomes.

Ask the patient about disability measured in sick days at work, or at home for homemakers. Inquire at each visit about the effects of the patient's migraine headaches on social and family obligations. Ask direct questions such as "Have you missed work because of your migraine headaches in the past month?" and "Have you had any problems fulfilling your family obligations because of headaches in the past month?" Record the patient's observations and compare them with previous visits to ascertain improvement in migraine associated disability.

Measures of outcomes using the Protocol for Migraine Headache Assessment are not in the scope of this study however, suggestions for further research using the protocol are included.

Suggestions for Future Research

The Protocol for Migraine Headache Assessment requires evaluation for validity and usefulness in the family practice setting. This can be accomplished by testing the protocol with APNs in family practice or community health clinics. The APNs can test the protocol by assessing and diagnosing headache patients using the Protocol for Migraine Headache Assessment, and then having the patient diagnosed by a neurologist specializing in headache treatment, functioning as co-investigator. The two diagnoses should then be compared to assess accuracy in identifying migraine headache disorder.

APN's working in family practice can further the study of headache diagnosis using the IHS criteria by keeping statistics on the use of the protocol. Useful information to be collected for retrospective research would be numbers of patients diagnosed with migraine, tension, and cluster headaches in the clinic, and subjective rating of success of treatment. Data on patient compliance with treatment regimen and follow up schedules would also be useful.

CONCLUSION

It is appropriate and cost-effective for APNs in family practice to diagnose and treat migraine headaches. Identification and elimination of barriers to migraine diagnosis and treatment and use of the International Headache Society criteria will enable the APN in family practice to more effectively treat migraine headaches. In addition to decreasing pain and disability of migraine sufferers, APNs can have a substantial impact on the tremendous personal and financial burden of migraine in this country.

APPENDICES

APPENDIX A

General Medical Information

GENERAL MEDICAL INFORMATION

Name _____ Date_____

Age ____ Occupation _____

Referred by _____ (Circle one) right handed left handed ambidextrous

(Circle one) female male

Primary Physician _____ (Circle one) married single divorced widowed other

INSTRUCTIONS: Please fill out each item and remember to bring it with you to the first visit.

FOR WHAT PROBLEM ARE YOU COMING TO SEE US? _____

_____

_____

_____

WHEN DID SYMPTOMS BEGIN? _____

DID SOMETHING CAUSE THIS? _____

IF A MOTOR VEHICLE ACCIDENT, PLEASE ANSWER THE FOLLOWING:

DATE OF ACCIDENT _____, WERE YOU THE DRIVER? yes no

WERE YOU WEARING A SEATBELT? yes no WERE YOU SEEN IN THE ER? yes no

IF A WORK RELATED INCIDENT, PLEASE ANSWER THE FOLLOWING?

DATE OF INJURY _____, ARE YOU ON WORKMAN'S COMP? yes no

ARE YOU OFF WORK BECAUSE OF THIS INCIDENT? yes no DATE LAST WORKED_____

IS THERE A LAWSUIT PENDING? yes no

WE NEED TO KNOW ABOUT YOUR GENERAL HEALTH FIRST. PLEASE CIRCLE THE FOLLOWING CONDITIONS THAT YOU AWARE OF HAVING IN THE PAST OR PRESENT TIME, INCLUDING SURGERY.

high blood pressure (hypertension)	diabetes	emphysema
asthma	heart problems	thyroid disorder
glaucoma	cancer	ulcers
seizures	head injury	neck problems
low back pain	headaches	stroke
nerve injury of any type	mental illness	substance abuse problems
eye problems	fractures	skin diseases
AIDS	other:	

DO YOU EXPERIENCE ANY OF THE FOLLOWING SYMPTOMS? PLEASE CIRCLE ALL THAT APPLY.

shortness of breath	chest pain	sleep difficulties
depression	sexual difficulties	passing out
numbness	weakness of arms or legs	muscle cramping
muscle twitching	clumsiness	handwriting change
walking problems	incontinence	vision difficulties
hearing loss	ringing in the ears	speaking problems
memory loss	change in behavior	fatigue
other:		

FAMILY HISTORY: (please circle all that apply to illness that run in the family)

unknown	stroke	migraine
diabetes	high blood pressure	heart disease
crippling muscle diseases	dementia or memory loss	epilepsy
Parkinson's disease	tremors	mental illness

PLEASE TELL US ABOUT THE FOLLOWING HABITS: (Circle all that apply)

CIGARETTES	I never smoked	I smoke__ packs/day	I quit __ yrs ago
OTHER	pipe	cigars	chewing/snuff
COFFEE	none or decaf only	less than 5 cups/day	more than 5 cups/day
SOFT DRINKS WITH CAFFEINE	1 or less per day	2-5 glasses per day	more than 5 glasses per day
ALCOHOL	never, a few times/year, a few per month, more than once per week, daily		

NUTRITION: WHAT TYPE OF DIET DO YOU FOLLOW?

no special diet low fat diabetic vegetarian heart diet weightloss

ANY ADDITIONAL VITAMINS OR FOOD SUPPLEMENTS? Please list here. _____

MEALTIMES breakfast ____ lunch ____ supper____

SLEEP: (circle all that apply)

no problem sleeping	trouble getting to sleep	trouble staying asleep
snoring	nightmares	excessive daytime drowsiness
need daytime naps	falling asleep accidentally	not refreshed after sleeping
use sleeping pills	use coffee to stay awake	use meds to stay awake

PRIOR MEDICAL CARE:

CIRCLE PAST TESTS AND FILL OUT AS WELL AS POSSIBLE:

TEST	WHERE IT WAS PERFORMED	WHEN DONE	RESULT
CT scan brain			
CT scan neck			
CT scan low back			
MRI brain			
MRI neck			
MRI low back			
Carotid duplex			
EEG (brainwaves)			
EMG (needle exam			
Myelogram			
other X-rays			
recent blood tests			

PLEASE NAME ALL OTHER PHYSICIANS YOU HAVE SEEN FOR THE PROBLEM YOU ARE SEEING US ABOUT, AS WELL AS OTHER PHYSICIANS IN YOUR CARE.

APPENDIX B

Headache Questionnaire

Edmund Messina MD

120 West Exchange Street, Owosso, MI 48867

HEADACHE QUESTIONNAIRE

NAME_____ DATE _____

INSTRUCTIONS: Please fill out each item. Please remember to bring this with you to the first visit

1 HOW MANY DIFFERENT TYPES OF HEADACHE DO YOU GET? _____

2 ON THE FOLLOWING LINES, BRIEFLY DESCRIBE THE TYPE OF PAIN EXPERIENCED WITH EACH TYPE OF HEADACHE YOU GET. WE WILL ASK MORE DETAILED QUESTIONS LATER. EACH HEADACHE IS DESCRIBED BY A LETTER, A, B, C ETC. USE ADDITIONAL PAGES IF NEEDED. BE SURE TO INCLUDE NECK PAIN.

A) _____

B) _____

C) _____

D) _____

3 FOR EACH HEADACHE TYPE, PLEASE CIRCLE THE NATURE OF THE PAIN

HEADACHE "A"	-Throbbing, pounding	-Sharp	-Burning	-Dull, pressure
HEADACHE "B"	-Throbbing, pounding	-Sharp	-Burning	-Dull, pressure
HEADACHE "C"	-Throbbing, pounding	-Sharp	-Burning	-Dull, pressure
HEADACHE "D"	-Throbbing, pounding	-Sharp	-Burning	-Dull, pressure

4 FOR EACH HEADACHE TYPE, WRITE THE LOWEST, AVERAGE AND WORST INTENSITY

Scoring the intensity of your headaches

level 1: Low level, aware of it but does not require treatment, easy to ignore

level 2: Hard to ignore, still may not lead you to treat it, does not keep you from working

level 3: Unable to work unless meds are used, uncomfortable and unable to ignore

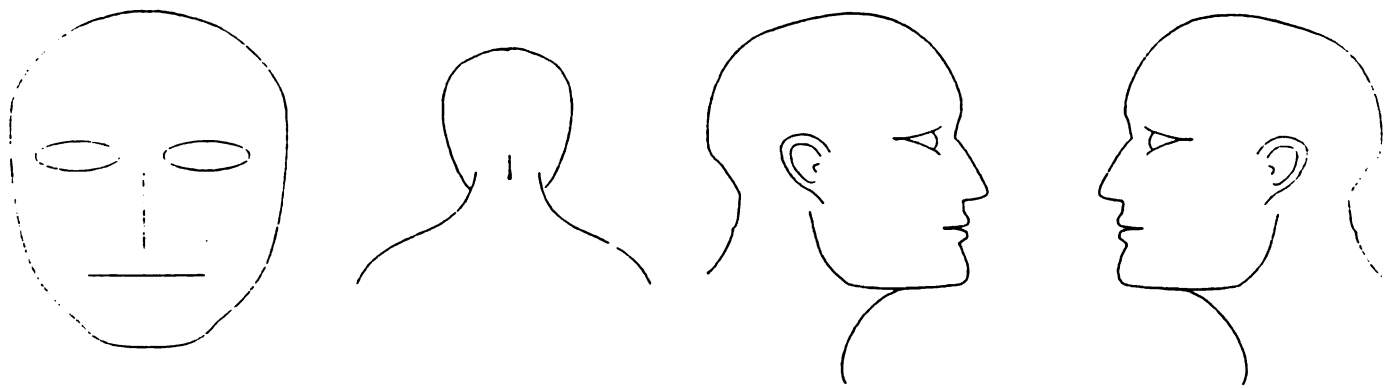
level 4: Severe, hard to concentrate, not able to perform mentally demanding jobs

level 5: intense, unable to function at all

	lowest	usual	highest
HEADACHE "A"	____	____	____
HEADACHE "B"	____	____	____
HEADACHE "C"	____	____	____
HEADACHE "D"	____	____	____

NOTE: This helps us decide which of the different headache types are the most troublesome.

5 **PLEASE SHADE IN THE PARTS OF YOUR HEAD THAT ARE PAINFUL.** YOU MAY WISH TO LABEL EACH HEADACHE TYPE. USE DIFFERENT COLORS IF YOU WISH.



6 **WHAT TIMES OF DAY ARE YOU MOST LIKELY TO GET A HEADACHE? PLEASE CIRCLE THE ONES THAT APPLY.**

midnight 1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11 NO PATTERN

7 **WHAT DAY(S) OF THE WEEK ARE YOU MOST LIKELY TO GET A HEADACHE? PLEASE CIRCLE.**

Monday Tuesday Wednesday Thursday Friday Saturday Sunday NO PATTERN

8 **WOMEN: WHEN IN YOUR MENSTRUAL CYCLE ARE YOU MOST LIKELY TO GET A HEADACHE? PLEASE CIRCLE.**

midcycle (ovulation) before periods during periods after periods no pattern NOT APPLICABLE

9 **HAVE YOU NOTICED ANYTHING THAT CAN TRIGGER OR START UP YOUR HEADACHES?** CIRCLE THE EXAMPLES BELOW AND ADD ANY OTHERS THAT YOU HAVE NOTICED.

too much sleep	not enough sleep	irregular sleep schedule	weekends
when relaxing	when stressed	after a stressful time	weather changes
bright lights	exertion	odors	certain seasons
alcohol	cigarette smoke	missed meals	loud noises
sex	certain foods:	_____	_____

10 **WHICH OF THE FOLLOWING WILL WORSEN THE HEADACHE DISCOMFORT?**

movement of head bending, stooping straining light noise

11 **WHICH OF THE FOLLOWING WILL HELP RELIEVE SOME OF THE HEADACHE PAIN?**

medications	a dark room	sleep	heating pad	ice pack
exercise	pacing	keeping busy	resting quietly	meditation

12 **WHICH OF THE FOLLOWING FEELINGS OCCUR WITH THE HEADACHES?**

GI	nausea	vomiting	cramping	diarrhea	constipation	hunger
SENSORY	tender scalp	tingling scalp	neck pain	numbness	burning	stabbing
SENSATIONS	ringing ears	"dizziness"	odors			
VISUAL	blurring	double vision	spots	flashes of light	zigzags	colors
EMOTIONS	confusion	irritability	depression	restlessness	"hyper" feelings	
MOTOR	slurred speech	no speech	weak arm	weak leg	droopy face	
GENERAL	chills	flushing	paleness	cold hands and feet		runny nose
	droopy eyelid	fluttering heart	confusion	fainting	anxiety	tiredness

OTHER _____

13 **DOES YOUR IMMEDIATE FAMILY SUFFER FROM HEADACHES? IF YES, CIRCLE THE ONES THAT APPLY**

UNKNOWN	SISTER	BROTHER
MOTHER	MOTHER'S PARENTS	MOTHER'S BROTHERS OR SISTERS
FATHER	FATHER'S PARENTS	FATHER'S BROTHERS OR SISTERS

14 **DID YOU REGULARLY EXPERIENCE ANY OF THE FOLLOWING AS A CHILD? PLEASE CIRCLE**

MOTION SICKNESS	GI UPSET WHEN EXCITED	COLICKY INFANT

15 **WOMEN: CIRCLE ANY OF THE FOLLOWING CHANGES IN HEADACHES ASSOCIATED WITH PREGNANCY:**

WORSENING WITH EARLY PREGNANCY	IMPROVED	NONE DURING PREGNANCY
MORE AFTER PREGNANCY	NO CHANGE	NOT APPLICABLE
OVERALL WORSE DURING PREGNANCY		STARTED WITH PREGNANCY

16 **IMPACT OF HEADACHE ON DAILY LIFE, PLEASE CIRCLE ITEMS AND COMMENT BELOW.**

CANNOT MAKE PLANS	MISSING WORK	MISSING SCHOOL
CANNOT FUNCTION	HURTING RELATIONSHIPS	MAKING ME DEPRESSED
VERY FRUSTRATING	USING TOO MANY MEDS	MAKES ME IRRITABLE
I AM NO FUN ANYMORE	LIFE IS A BURDEN	I WISH I WOULD DIE

COMMENTS:

17 **WHO DO YOU DEPEND ON FOR SUPPORT DURING THESE TRYING TIMES? CIRCLE ONE OR MORE.**

SPOUSE	SIGNIFICANT OTHER	PARENT	SIBLING
FRIEND	CLERGY	COUNSELLOR	PHYSICIAN

OTHER _____

PREVIOUS HEADACHE MEDICATIONS

PLEASE REVIEW THIS LIST CAREFULLY AND CIRCLE ALL MEDS TRIED FOR HEADACHE RELIEF OR PREVENTION MARK ANY COMMENTS NEXT TO THE MED, OR BELOW. WE NEED TO SEE WHAT WORKED, WHAT MADE YOU WORS AND WHAT YOU DID NOT TOLERATE WELL.

ADAPIN
ADVIL
ALEVE
ALKA SELTZER
ANACIN
ANAPROX
ATIVAN
ANTIVERT
ASENDIN
ASPIRIN
AXOTAL
AVENTYL
BELLERGAL
BLOCADREN
BUFFERIN
BUSPAR
CAFERGOT TABS
CAFERGOT SUPPOS.
CALAN
CARDIZEM
CENTRAX
CLINORIL
CODEINE
COMPAZINE
CONTAC
CORGARD
DARVOCET
DARVON
DECADRON
DEMEROL
DEPAKENE
DEPAKOTE
DESYREL
DHE
DILANTIN
DISALCID
DOLOBID
DRISTAN
DURAGESIC
EFFEXOR
ELAVIL
ENDEP
ENTEX
EQUAGESIC
ERGOMAR
ESGIC
EXCEDRIN
FELDENE
FIORICET
FIORINAL
FIORINAL #3
FLEXARIL
HALCION
INDOCIN
ISOPTIN
KLONOPIN
IBUPROFEN
IMITREX
LIBRAX
LIBRIUM
LIMBITROL
LIORISAL
LITHIUM
LOPRESSOR
LUDIOMIL
MARPLAN
MECLOMEN
MEDROL
METHADONE
MEXITIL
MICRAININ
MIDOL
MIDRIN
MORPHINE
MYSOLINE
NALFON
NAPROSYN
NAPROXIN
NARDIL
NORFLEX
NORGESIC
NORPRAMIN
NUPRIN
PAMELOR
PARAFON FORTE
PARNATE
PAXIL
PERCOCET
PERCODAN
PERIACTIN
PHENERGAN
PHENOBARBITAL
PHRENALIN
PONSTEL
PREDNISONE
PROCARDIA
PROPRANOLOL
PROZAC
RESTORIL
ROBAXIN
ROBAXISAL
SANSERT
SERAX
SINE-AID
SINEQUAN
SINUTABS
SKELAXIN
SOMA
STADOL SPRAY
SUDAFED
SURMONTIL
TALWIN
TEGRETOL
TENORMIN
THORAZINE
TIGAN
TIMOLOL
TOFRANIL
TOLECTIN
TORECAN
TORADOL
TRANXENE
TRIAVIL
TYLENOL
TYLENOL #3
TYLOX
VALIUM
VANQUISH
VERAPAMIL
VICODIN
VISTARIL
VIVACTYL
WIGRAINE SUPPOS.
WIGRAINE TABS
XANAX
ZOLOFT

OTHER MEDS TRIED:

_____

_____

_____

_____

_____

_____

COMMENTS:

_____

_____

_____

APPENDIX C

Headache Diary

MICHIGAN HEADACHE
TREATMENT NETWORK
LANSING - OWOSSO

Month

Date	Begin	Duration In hrs	Grade 1-5	Triggered by	Relieved by med, etc.	Menses Start stop
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						

APPENDIX D

Migraine Headache Assessment

MIGRAINE HEADACHE ASSESSMENT

HISTORY

1. **Chief Headache Complaint**
2. **Headache History**
   a. age of onset
   b. location of pain
   c. description of pain
   d. duration of pain
   e. description of prodrome
   f. description of aura
   g. associated systems
   h. behavior during headache
   i. headache triggers
   j. past headache medications
   k. past and present O.T.C. use
   l. headache frequency
   m. gradual or sudden increase
   n. menstrual history
   o. mental health history
3. **Review of Neurologic Systems**
   a. mental or memory changes
   b. nausea and/or vomiting
   c. dizziness, unsteadiness, clumsiness
   d. weakness or paralysis of the extremities
   e. numbness, tingling, loss of sensation
   f. slurred speech, difficulty swallowing
   g. word finding difficulties
   h. blurred or distorted vision
   i. double vision or blindness
   j. ringing or buzzing in ears
   k. seizures or syncope
   l. head trauma, accidents
   m. alcohol or other substance abuse
   n. history of stroke (hemorrhagic, ischemic)
   o. change in bowel or bladder control
4. **Headache Treatment Barrier Assessment**
   a. patient characteristics-male, low-income, chronic headache, O.T.C. use, young age. emotional distress, lack of knowledge about migraine headache
   b. incorrect diagnosis-practitioner failure to correctly diagnose, practitioner bias, lack of valid case definition
   c. ineffective treatment-practitioner failure to treat all migraine symptoms, patient difficulty with treatment and follow-up regimens, patient/practitioner relationship problem, patient non-compliance
5. **Medical History**
   a. review of systems
   b. past medical/surgical history
   c. current medications
   d. allergies
   e. family history
   f. social history

PHYSICAL EXAMINATION

1. **General Physical Examination**
   ncluding but not limited to: cranium, eyes, sinuses, thyroid, lymph nodes, heart, lungs, circulation
2. **Neurological Examination**

a. mental status: language, orientation, level of consciousness, memory, concentration

b. cranial nerves: I-smell, II acuity, fundi, pupils, visual fields. III, IV,& VI-extra ocular movements, double vision, pupils. V-corneal reflex, masseter & temporalis strength, sensory portion. VII-facial motor. VIII-hearing. IX, X-gag reflex, palate position, swallowing. XI-sternocleidomastoid and trapezius strength. XII-tongue movement,

c. motor: tone-spasticity, rigidity. power- pronator drift, direct muscle testing, hemi or paraparesis, proximal-distal weakness, mass, atrophy

d. coordination: finger to nose, heel to shin, rapid alternating movements, gait-heel walking, toe walking, tandem, (steady? broad based?) Romberg

e. reflexes: DTRs-biceps, triceps, knee, brachioradialis, ankle. pathologic reflexes-Babinski, sucking, grasp, palmer-mental, Kernig, Brudzinski

f. sensory: pin prick, light touch, vibratory sense, temperature, graphesthesia, stereognosis, proprioception

g. vascular: carotid, subclavian, vertebral, temporal arteries

3. **Headache Danger Signs**
   a. onset of headache after age 40
   b. onset of new or different headache
   c. "worst headache of my life"
   d. onset of subacute headache that progressively worsens
   e. headache onset with exertion, sexual activity, coughing
   f. headache associated with change in neurological status:
   drowsiness, confusion, memory problems, weakness, ataxia, loss of coordination, sensory loss, unequal pupils, asymmetric deep tendon response, Babinski response, signs of meningeal irritation, visual changes, abnormal medical exam, fever, hypertension, chronic malaise, myalgia, arthralgia, weight loss, tender and poorly pulsatile temporal arteries, papilledema

IHS CRITERIA

The following criteria should be used only after secondary headache has been ruled out.

1. **Migraine Without Aura**
   a. at least 5 attacks fulfilling b-d
   b. headache lasts 4-72 hours
   c. headache has 2 of the following:
      1. unilateral location
      2. pulsating quality
      3. moderate or severe intensity (inhibits or prevents activities)
      4. aggregation by routine physical activities
   d. during the headache at least 1 of the following:
      1. nausea and/or vomiting
      2. photophobia and/or phonophobia
2. **Migraine With Aura**
   a. at least 2 attacks fulfilling b
   b. at least 3 of the following:
      1. one or more fully reversible aura symptoms
      2. at least 1 aura symptom develops gradually (4 or more min.)
      3. no aura symptom lasts more than 60 minutes
      4. headache follows aura with a free interval of less than 60 min.
3. **Tension-Type Headache**
   a. at least 2 of the following pain characteristics
      1. pressing/tightening (nonpulsating quality)
      2. mild or moderate intensity, inhibits not prohibits activities
      3. bilateral location
      4. no aggravation by routine activity
   b. both of the following:
      1. no nausea or vomiting
      2. photophobia or phonophobia absent or only 1 present
4. **Cluster Headache**
   a. at least 5 attacks fulfilling b-d
   b. severe unilateral orbital, supraorbital, and/or temporal pain lasting 15 to 180 minutes
   c. headache associated with at least 1of the following (on pain side)
      1. conjunctival injection
      2. lacrimation
      3. nasal congestion
      4. rhinorrhea
      5. forehead and facial sweating
      6. miosis
      7. ptosis
      8. eyelid edema
   d. frequency of attacks: from 1 every other day to 8 per day

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