Introduction

In the last decade, migraine headaches have become a common health complaint. A review in 2013 indicated that anywhere between 16.2% to 22.7% of adults over the age of 18 complained of episodic or chronic migraines.\(^1\) The occurrence was higher in females than in males, and specifically in women of reproductive age.\(^1, 2\) A large amount of data on the rates of migraine occurrence, treatment, predisposing factors, comorbidities, and prevention has been collected and analyzed by the American Migraine Prevalence and Prevention (AMPP) study; this is an ongoing study that is continuing to collect and report such data on migraine epidemiology.\(^1, 3\) The data is accessible to various research groups that choose to analyze various parts/subsections of the data for practical applications.\(^1, 3\) Besides being more dominant in the female population, there is also a higher prevalence of migraines noted in low-income households.\(^3, 4, 5\) Migraines have been stated as one of the most common reasons for work-related disability claims, and therefore warrant significant attention due to burden created on the healthcare sector and government benefits.\(^5\)

This article will begin with a description of migraines headaches, then turn to a discussion of various naturopathic treatments that are useful for the prevention and treatment of the same. The data is presented in a simple format, with clinical input where applicable.

Besides being commonly one-sided, the characteristics of a migraine headache usually include one or more of the following symptoms:\(^5\)

- Intense pain worsened by activities of daily living;
- Pulsating or throbbing sensations;
- Photophobia (low tolerance to bright lights);
- Phonophobia (low tolerance to loud or even usual noises);
- Accompanied by nausea or vomiting;
- Can last anywhere between 4 and 72 hours.
Migraines can be further classified as migraines with and without aura.\textsuperscript{[5]} Migraines with aura fulfill two or more of the above criteria and also have some form of associated localized neurological symptoms such as vision changes, inability to speak or slurred speech, numbness or tingling along one side of the face or body, and weakness of arms and legs.\textsuperscript{[5]} These neurological symptoms last for up to an hour and are completely reversible; however, the total migraine episode can last up to three days.\textsuperscript{[5]}

Due to the disabling nature of migraines, the need for preventative treatment has been iterated by several studies.\textsuperscript{[1, 2, 3, 5, 6]} The majority of treatment protocols (up to 80\%) in the United States are based on the use of the class of prescription drugs called triptans, with the most common one being sumatriptan.\textsuperscript{[1, 2]} Overall, review of the AMPP data indicates that more people could benefit from incorporating preventative strategies.\textsuperscript{[1]} The majority of the preventative data in these studies relate to pharmaceuticals; however, other studies have demonstrated promising results with nutritional supplements and herbal extracts, and call for the integration of these into medical practice.\textsuperscript{[7, 8]} The upcoming sections of this article will discuss front-line natural therapies for prevention and treatment of migraines.

**The Role of Diet**

As a naturopathic doctor, I always ask my patients detailed questions about their diets. What they eat, how they prepare their foods, how often they eat, and any known reactions — either immediate (such as rashes, hives) or delayed (such as constipation, gas, bloating, migraines) — that are associated with specific foods. This is important especially for migraines, since patients report that specific foods can trigger the onset of migraine, and a migraine episode may be prevented simply by avoiding the specific food. The scientific literature shows mixed data on the association of migraines and food triggers,\textsuperscript{[9, 10, 11]} but in practice I see the success of eliminating food triggers on a daily basis.

Many common foods are on the suspect list, and the specific compounds within these have been identified as the most probable causative factor. Some examples include phenyl ethylamines in chocolate, tyramines in cheese, histamine and sulfites in wines and beers, and nitrates in processed meats.\textsuperscript{[12]} Gluten sensitivity has been documented as a possible cause of chronic headaches and migraines in patients with irritable bowel or celiac disease.\textsuperscript{[10, 11]} An artificial sweetener, aspartame, that is often found in diet sodas
and sugarless mints and chewing gum, has been associated with migraines too.\textsuperscript{[12, 13]} Many patients claim MSG (monosodium glutamate), which is a common food additive especially in Chinese food, appears to be a trigger.\textsuperscript{[12, 13, 14]} Claims relating neurological symptoms associated with aspartame and MSG have been refuted by the FDA, but in practice I continue to see the correlation with aspartame and MSG, and patients report less or no migraines with avoidance of these two food additives.

Coffee or specifically caffeine is usually helpful in cutting the course of a migraine short.\textsuperscript{[12]} A large multicenter, double-blind, double-dummy, crossover-controlled study of 108 patients in Italy determined that 130 mg of caffeine combined with 1000 mg of paracetamol was as effective as sumatriptan 50 mg in reducing pain levels of migraines.\textsuperscript{[15]} There has been some data that indicates that caffeine withdrawal in itself can act as a trigger.\textsuperscript{[12]}

The best test for figuring out food triggers appears to be the elimination of suspect foods for a specified time and then, reintroduction in a systematic manner to confirm if they are a causative factor.\textsuperscript{[12, 14]} I typically recommend my patients to avoid the suspected foods for a minimum of two weeks and a maximum of four, before reintroducing them back one at a time. I recommend reintroducing or challenging the body with a one-time exposure to a food, and then waiting for an additional 48 hours before adding any foods. This helps identify any delayed response to the suspected food. Keeping a detailed diet diary during this process gives me, the doctor, as well as the patient very good information on how certain foods affect their body.

Once the aggravating foods have been identified, it is important to support the cardiovascular, immunological, and neurological pathways that are also involved in the etiology of migraines, to help minimize the frequency, intensity, and duration of the episodes. There are also treatments that can reduce symptoms once an episode has begun. Select herbs and nutritional supplements are used for this purpose.

**Key Supplements for Migraine**

Many of the herbal treatments that help with prevention and treatment of migraines affect the underlying causative mechanisms of a migraine headache. As described earlier, there are multiple factors in the central and peripheral nervous system, the immune system, and the cardiovascular system that contribute to a migraine episode.\textsuperscript{[5, 16]} A simple way to
understand this is to know that when normal neurological signals are interrupted in the brain by an immune response, it affects the blood perfusion of certain areas of the brain, resulting in uneven vasodilatation.[5] As we continue to learn more about migraines, more herbal products will continue to be studied more formally. The following data provides a review of some of these treatments that have been studied so far.

*Petasides hybridus*, commonly known as butterbur, has been used historically for many different ailments including headaches and migraines.[17] A major review of various complementary therapies studied between June 1999 and May 2009 revealed that butterbur was a safe and effective option for both prevention and treatment of migraines.[18] Butterbur has shown decrease in the incidence, duration, and intensity of migraine headaches when used at a dose of 50 to 100 mg/d for a period of four to six months.[17, 18, 19, 20] Two randomized, placebo-controlled studies in 2001 and 2004 showed significant benefits for migraine,[19, 20] and the safety of *Petasides* has been well-established for extracts that have the toxic components pyrrolizidine alkaloids removed.[17, 21]

*Tanacetum parthenium*, commonly known as feverfew, has also received attention with regards to migraine prophylaxis.[18] Its effectiveness is established at a minimum dose of 6.5 mg three times per day, to up to a maximum of 100 mg of the herbal extract.[18]

Magnesium is an essential element needed for over 300 functions in the body, and is used for relieving spasms.[22, 23, 24] A double-blind, multicenter, placebo-controlled trial has shown promising results in decreasing the frequency of migraines at a dose of 600 mg of trimagnesium tricitrate per day; however, a common side effect can be diarrhea.[22, 24, 25, 26] In my practice, I use magnesium glycinate at 240 mg twice per day to avoid causing diarrhea.

Coenzyme Q$_{10}$ is an essential cofactor in the energy production pathway in the mitochondria of cells, and has been studied for both adult and pediatric migraine. These studies indicate that a dose of up to 200 mg twice daily, or 10 mg/kg/d in two divided doses for children, is of benefit in the treatment of migraines.[22, 23, 27]

Riboflavin (vitamin B$_2$) is an essential B vitamin and is a good choice for migraine prophylaxis. In a study of pediatric and adolescent patients, supplementation with riboflavin was associated with a reduction in both migraine attack frequency as well as intensity.[28] Since the B vitamins act synergistically in the body, a B-complex vitamin is often recommended.

Methylenetetrahydrofolate (MTHF) is the active form of folic acid that is required in the body to convert a harmful metabolite called homocysteine into an amino acid methionine.[16, 29]
Higher levels of homocysteine have been found to be associated with migraines with aura and therefore, treating the underlying cause of hyperhomocysteinemia can help to reduce their occurrence.\textsuperscript{[16, 29]} The methylenetetrahydrofolate reductase (MTHFR) mutation of C677T is known to result in hyperhomocysteinemia and is the best known treatment to reduce the levels to provide the patient with the MTHF form of folic acid in the form of supplementation.\textsuperscript{[16, 29]} The optimal dose still needs to be determined; however, MTHF is currently available as 1.2 mg per dose. In my practice, I use 1.2 mg MTHF twice daily over a span of three months and see significant reductions in homocysteine levels, with corresponding decreases in headache or migraine symptoms.

**Individualizing Treatment**

An essential characteristic of naturopathic medicine is the principle of individualizing treatment to the patient. In practice, a selection of the therapies discussed in this article are combined in order to achieve the best possible outcome for a particular patient. This typically involves eliminating offending trigger foods, utilizing key supplements, and even medications if and when necessary. The foods and supplements differ from patient to patient. In the literature, a review highlighted the importance of personalized care based on the three ‘-omics’: genomics, proteomics, and metabolomics, all of which are important in the pathophysiology of migraines.\textsuperscript{[30]} It is also important to minimize known environmental triggers like volatile organic compounds (VOCs), but avoidance of these is not always possible; therefore, it is important to help build the patient’s resilience to these exposures using the above strategies.

There are other nonmedicinal means of treatment and prevention for migraines that have shown promising data in trials; however, I have focused on the ones that are best known and most commonly used in practice. These additional treatments deserve a mention, as more research is being conducted to establish their effectiveness and safety. Acupuncture has been established as an effective and relatively safe treatment to reduce the frequency of migraines.\textsuperscript{[31, 32]} Aerobic exercise has been documented as decreasing the intensity of migraine due to its effect on pain modulation pathways, but it may or may not directly influence the frequency or duration of the episodes on its own.\textsuperscript{[33]} Biofeedback mechanisms appear to be helpful if used in conjunction with either supplements or medications, but require knowledgeable analysis on the part of the doctor to identify the underlying mechanism of the headache.\textsuperscript{[34]} For the management of menstrual migraines, treating the underlying hormonal deficiencies appears to relieve
patients of migraines. This treatment of hormonal imbalance can be through herbs, supplements, or hormone replacement therapy.

Homeopathy has been considered as a treatment for migraine as well. A literature review failed to support its effectiveness for headaches and migraines; however, in practice I have seen benefit from remedies like Belladonna and Gloninum in the treatment of migraines, even to the extent of the patient being able to avoid the use of ibuprofen and prescription medications. Homeopathy as we know best works when individualized, and therefore, is difficult to be studied in a randomized, double-blind, placebo-controlled setting as the inclusion criteria of such studies rarely take into consideration unique characteristics of the patient’s migraine.

In conclusion, we have seen that many naturopathic treatments for migraine are well supported by scientific evidence. Other strategies are currently lacking in evidence, such as the role of some food sensitivities cited; however, the skillful application of such approaches by a naturopathic doctor may yet be effective for migraine treatment and prevention. In naturopathic practice, these therapies are individualized according to the patients’ symptoms and with consideration of patient’s lifestyle, diet, and social aspects; naturopathic strategies can play a central role in preventing and minimizing episodes of this debilitating condition.

References


