Annals of Medicine and Medical Sciences (AMMS)
Volume 04, 2025, *Page No.: 843 to 851*
Available at: *http://ammspub.com*

Review Article

OPEN ACCESS

Behind the Headache: Comprehensive Migraine Management, The Role of Medicinal and Holistic Therapies

Dr Saumya Harsh Mittal *[1], Dr Salony Mittal [2]

[1]Associate Professor, Department of Medicine, SMSR, Greater Noida, Uttar Pradesh, India.
[2]Professor, Department of Pathology, SMSR, Greater Noida, Uttar Pradesh, India.

*Corresponding author: Dr Saumya Harsh Mittal; *saumyamittal1@gmail.com*

Abstract

Migraine is a prevalent and disabling neurological condition characterized by recurrent, intense headaches, often accompanied by nausea, light sensitivity, and aura. The management of migraines typically involves pharmacological treatments, but recent advancements have emphasized the importance of a holistic approach that integrates conventional, newer, and alternative therapies. The full spectrum of migraine treatment, focuses on acute and preventive medications, newer treatments such as CGRP inhibitors and neuromodulation techniques, and non-pharmacological therapies including nutrition, stress management, and physical therapies. By combining medications, innovative therapies, and complementary treatments, a more comprehensive, personalized, and effective management plan can be developed to reduce the frequency, intensity, and impact of migraines. The importance of addressing migraine triggers, such as diet, sleep, and stress, is emphasized to promote long-term migraine prevention and overall well-being. The integration of these approaches holds promise for improving patient outcomes and empowering individuals to take an active role in managing their condition.

Keywords: ***Migraine, Holistic Approach, Conventional Treatment, CGRP Inhibitors, Neuromodulation, Preventive Treatment, Stress Management, Nutrition, Chronic Migraine, Non-Pharmacological Therapies.***

Introduction

Migraines are a prevalent and disabling neurological disorder, affecting approximately 12% of the global population, with a higher prevalence in women. These chronic headaches are often accompanied by symptoms such as nausea, vomiting, and heightened sensitivity to light and sound. While conventional pharmacological treatments, including analgesics, triptans, and preventive medications, can offer relief, they may not always be effective for all patients. Traditional treatment primarily focuses on managing the physical symptoms of migraine attacks, often neglecting these broader contributors. Furthermore, long-term use of medications can be associated with undesirable side effects. This has led to increasing interest in holistic treatments that address not only the physiological aspects of migraines but also emotional, psychological, and lifestyle-related factors. Holistic treatments recognize the complexity of migraine pathophysiology and aim to offer a more comprehensive solution [1,2].

History of Migraine

Migraine has a long and complex history, with its roots traceable back to ancient civilizations. The term "migraine" is derived from the Greek word hemicrania, meaning "half the head," which reflects the common pattern of the headache's unilateral nature. The ancient Greek physician Hippocrates was one of the first to document the condition, describing migraines as head pain associated with nausea and visual disturbances. In ancient Egypt, treatments for migraines included herbal remedies and ritualistic practices. Throughout history, various cultures have contributed to understanding migraines, from the Greeks and Romans to Islamic scholars, who expanded on these early ideas. In the Indian context, references to migraine-like symptoms can be found in ancient texts like the Sushruta Samhita, an important Ayurvedic text. The Ayurvedic tradition identifies migraines as "Shiro Roga" (head diseases), which are thought to be caused by imbalances in the body's doshas (vata, pitta, and kapha) and treated through dietary changes, herbal remedies, and therapies like Panchakarma. In Unani medicine, migraines are seen as a result of an imbalance in the body's humors, treated using specific herbal concoctions and therapies such as cupping [3-5].

In the modern era, the understanding of migraines advanced significantly in the 19th and 20th centuries. In the 19th century, scientists began exploring the vascular theory of migraines, suggesting that the condition was linked to changes in blood flow in the brain. In the 20th century, the discovery of drugs like ergotamine and, later, triptans revolutionized migraine management. While modern medicine has brought significant advancements in migraine treatments globally, these traditional practices continue to play a vital role in the holistic management of migraines in India [6,7].

Received: July 03, 2025; **Revised:** July 30, 2025; **Accepted:** August 04, 2025

Discussion

Acute Treatments for Migraine

Acute treatments for migraines aim to relieve symptoms and shorten the duration of an attack. These treatments include analgesics, triptans, ergotamines, anti-nausea medications, opioids, and other pain relievers like naproxen and indomethacin. Each of these medications has its own history, mechanisms of action, and clinical uses.

Analgesics such as **acetaminophen, ibuprofen, aspirin, naproxen,** and **indomethacin** are commonly used for mild to moderate migraines. Acetaminophen, introduced in the late 19th century, was widely adopted for its ability to provide pain relief with fewer gastrointestinal side effects compared to aspirin. **Aspirin**, derived from willow bark, has been in use for centuries and was first recognized in the 19th century as a potent analgesic. **Ibuprofen**, introduced in 1969, is an NSAID that works by inhibiting cyclooxygenase enzymes to reduce pain and inflammation. Similarly, **naproxen**, another NSAID introduced in the 1970s, is commonly prescribed for migraine relief due to its anti-inflammatory properties. **Indomethacin**, introduced in the 1960s, is another NSAID that provides effective pain relief and is sometimes used in specific types of headaches, such as cluster headaches, and migraines. These medications are typically the first choice for pain relief due to their effectiveness, accessibility, and low cost [1-3,7].

Table 1: Analgesics-Doses, Efficacy and Side Effects

Analgesic	Year of Introduction	Common Doses	Efficacy	Common Side Effects
Acetaminophen	1893	Oral: 325-1000 mg every 4-6 hours (max 4000 mg/day)	Moderate efficacy for mild to moderate migraine pain.	Liver toxicity (in overdose), nausea, stomach upset, allergic reactions.
Aspirin	1899	Oral: 500-1000 mg every 4-6 hours (max 4000 mg/day)	Effective for mild to moderate migraines.	Gastrointestinal upset, ulcers, bleeding, tinnitus, dizziness.
Ibuprofen	1969	Oral: 200-400 mg every 4-6 hours (max 1200 mg/day for OTC, 2400 mg/day for prescription)	Effective for mild to moderate pain relief.	Stomach irritation, gastrointestinal bleeding, dizziness, kidney issues.
Naproxen	1976	Oral: 250-500 mg every 12 hours (max 1000 mg/day)	Effective for mild to moderate migraine pain relief.	Gastrointestinal irritation, drowsiness, headache, dizziness, kidney problems.
Ketorolac	1989	Oral: 10 mg every 4-6 hours (max 40 mg/day); IM: 30 mg initial dose	Effective for moderate to severe migraine pain.	Gastrointestinal bleeding, ulcers, dizziness, kidney damage, heart problems.
Paracetamol / Codeine	1960s-1970s	Oral: Paracetamol 500 mg + Codeine 8-30 mg every 4-6 hours (max 4000 mg/day for paracetamol)	Effective for moderate pain, combination often more effective than single agents.	Drowsiness, constipation, dizziness, nausea, addiction risk (codeine).
Diclofenac	1973	Oral: 50-100 mg every 8-12 hours (max 150 mg/day)	Effective for mild to moderate pain.	Stomach pain, gastrointestinal bleeding, dizziness, headache, liver toxicity.

Triptans are considered the first-line treatment for moderate to severe migraines. These serotonin receptor agonists, were introduced in the early 1990s. Triptans work by binding to serotonin receptors in the brain, which constricts blood vessels and inhibits the release of pro-inflammatory substances, helping to alleviate pain. **Sumatriptan**, the first triptan, was approved in 1992 and quickly became a cornerstone in migraine treatment. Other triptans, such as **rizatriptan**, offer faster onset times and fewer side effects, making them highly effective for treating acute migraine attacks. Their introduction marked a significant advancement in migraine treatment due to their targeted action and improved efficacy compared to older therapies [6,8].

Table 2: Triptans-Doses, Efficacy and Side Effects

Triptan	Year of Introduction	Common Doses	Efficacy	Common Side Effects
Sumatriptan	1991	Oral: 25-100 mg (max 200 mg/day)	High efficacy in treating acute migraines.	Dizziness, drowsiness, chest tightness, nausea, tingling, flushing, fatigue.
Zolmitriptan	1997	Oral: 2.5-5 mg (max 10 mg/day)	Comparable to sumatriptan in efficacy.	Dizziness, somnolence, dry mouth, nausea, chest tightness, tingling.
Rizatriptan	1998	Oral: 5-10 mg (max 30 mg/day)	High efficacy, fast onset, and generally well-tolerated.	Dizziness, drowsiness, fatigue, nausea, dry mouth.
Naratriptan	1998	Oral: 1-2.5 mg (max 5 mg/day)	Longer duration of action, lower recurrence rate.	Drowsiness, dizziness, nausea, fatigue, chest discomfort.
Almotriptan	1999	Oral: 6.25-12.5 mg (max 25 mg/day)	High efficacy, well tolerated with fewer side effects.	Dizziness, dry mouth, fatigue, nausea.
Eletriptan	2002	Oral: 20-40 mg (max 80 mg/day)	High efficacy, especially for severe attacks.	Dizziness, fatigue, nausea, chest discomfort, dry mouth.
Frovatriptan	2003	Oral: 2.5 mg (max 7.5 mg/day)	Longest duration of action; effective for preventing recurrent migraines.	Dizziness, fatigue, nausea, dry mouth, chest tightness.

Dosing Considerations

Sumatriptan: Available in **oral tablets, nasal spray,** and **subcutaneous injection**. The oral dose typically starts at 25 mg, but it can be increased to 100 mg based on response. Injection doses are often 6 mg subcutaneously, while nasal spray typically uses 5-20 mg[6,8].

Zolmitriptan: Available in **oral tablets** and a **nasal spray**. The oral dose is usually 2.5 mg, which can be increased to 5 mg if necessary. Nasal spray typically starts at 5 mg [6,8].

Rizatriptan: Available in **oral tablets** and **orally disintegrating tablets**. Typical oral dosing starts at 5 mg, and the maximum dose is 10 mg per dose, with a maximum of 30 mg/day [6,8].

Ergotamines have been used to treat migraines since the 1920s. **Ergotamine tartrate** and **dihydroergotamine** are the most commonly used forms, and both are derived from the ergot fungus. These medications work by constricting blood vessels, which helps to alleviate the pain associated with migraines. While effective, ergotamines are less commonly prescribed today due to their potential side effects, including nausea, vomiting, and cardiovascular complications. The development of triptans, which have fewer side effects, has led to a decline in the use of ergotamines for migraine relief [9].

Since nausea is a common symptom of migraines, medications like **metoclopramide** and **prochlorperazine** are frequently prescribed to alleviate this symptom. **Metoclopramide**, introduced in the 1960s, is a dopamine antagonist initially developed to treat gastrointestinal issues but later found to be effective for controlling nausea in migraine patients. **Prochlorperazine**, another antiemetic, is used to prevent and treat nausea and vomiting that often accompany migraines. These medications help patients tolerate oral medications and make the migraine episode more manageable [10].

Opioids are considered a last resort for severe, refractory migraines that do not respond to other therapies. Opioids like **morphine** or **hydrocodone** are potent analgesics that provide relief, but their use is highly discouraged due to the risks of dependence, tolerance, and addiction. Because of these risks, opioids are typically reserved for cases where other treatments have failed, and healthcare providers carefully weigh their benefits and harms [11].

Ditans, such as **Lasmiditan**, are a newer class of medications used to treat acute migraines. Unlike traditional triptans, which constrict blood vessels, ditans work by targeting the **5-HT1F** receptors in the brain, which helps reduce migraine symptoms without causing vasoconstriction. This makes them a valuable option for individuals with contraindications to triptans, especially those with cardiovascular conditions. Lasmiditan is typically taken orally and is effective in treating moderate to severe migraines. The most common side effects include dizziness, fatigue, and somnolence. Ditans are generally well-tolerated and present a safer alternative for certain patient populations when compared to traditional migraine treatments [12,13].

Preventive Treatments for Migraine

Preventive treatments aim to reduce the frequency, severity, and duration of migraines, improving the patient's overall well-being. Various medications have been developed for migraine prevention, each with distinct mechanisms of action and side effect profiles. The following are some of the most commonly used preventive treatments for migraines.

Beta-blockers, particularly propranolol and metoprolol, are widely prescribed for migraine prevention. These medications are believed to work by reducing the excitability of the brain and stabilizing blood vessels, thereby preventing the onset of migraines. They are effective in patients with frequent attacks and can be used as a first-line therapy. Propranolol and metoprolol are generally well-tolerated, but they may cause side effects such as fatigue, dizziness, and bradycardia. Beta-blockers are contraindicated in patients with asthma or other respiratory conditions, as they may exacerbate bronchoconstriction [14].

Antiepileptic drugs, such as topiramate and valproate, are FDA-approved for migraine prevention. These drugs are primarily used to control seizures but have also been found to reduce the frequency of migraines. Topiramate is often the first choice due to its effectiveness, but it can cause side effects such as cognitive impairment, weight loss, and tingling sensations. Valproate, while effective, is associated with potential teratogenic effects, making it unsuitable for women who are pregnant or planning to become pregnant. Both drugs can also cause gastrointestinal distress, fatigue, and dizziness [15].

Tricyclic antidepressants, particularly amitriptyline, are frequently prescribed for migraine prevention, especially in patients who have co-existing anxiety or depression. Amitriptyline works by increasing serotonin and norepinephrine levels in the brain, which helps to regulate pain and mood. The medication is typically prescribed in low doses for migraine prevention. Common side effects include dry mouth, sedation, weight gain, and blurred vision. TCAs should be avoided in patients with a history of arrhythmias, as they can exacerbate heart conditions [16].

Calcitonin gene-related peptide (CGRP) inhibitors represent a newer class of migraine prevention drugs. Monoclonal antibodies such as erenumab, fremanezumab, and galcanezumab work by blocking CGRP, a molecule that plays a key role in the pathophysiology of migraines. These inhibitors have shown promising results in reducing the frequency of attacks, particularly in patients with chronic migraines. CGRP inhibitors are generally well-tolerated, but possible side effects include injection site reactions, constipation, and fatigue. They are contraindicated in individuals with hypersensitivity to the components of the drug [17].

Botox (onabotulinumtoxinA) has been FDA-approved for the prevention of chronic migraines. Botox works by inhibiting the release of neurotransmitters involved in pain signaling, thereby reducing the intensity and frequency of migraines. Botox is administered via injections around the head and neck. It is particularly effective in patients who experience chronic migraines (more than 15 days per month). The most common side effects are neck pain, headaches, and muscle weakness. Botox should be avoided in patients with a history of neuromuscular disorders [18].

Table 3: Prophylaxis Therapy

Drug	Year of Introduction	Dose for Migraine Prevention	Side Effects	Contraindications
Propranolol	1960	80-240 mg/day	Fatigue, bradycardia, dizziness	Asthma, bradycardia
Metoprolol	1970s	100-200 mg/day	Fatigue, dizziness, bradycardia	Asthma, bradycardia
Topiramate	1990s	50-100 mg/day	Cognitive impairment, weight loss, paresthesia	Pregnancy, kidney stones

Valproate	1980s	250-500 mg/day	Weight gain, nausea, tremors	Pregnancy, liver disease, pancreatitis
Amitriptyline	1960s	10-30 mg/day	Dry mouth, sedation, weight gain	Heart conditions, glaucoma
Erenumab	2018	70 mg/month (subcutaneous)	Injection site reactions, constipation	Hypersensitivity to drug components
OnabotulinumtoxinA (Botox)	2010	155-195 units (injections)	Neck pain, muscle weakness, headaches	Neuromuscular disorders

Migraine Treatment with Herbal Remedies: Ayurvedic, Aromatherapy, Homeopathy, and Unani Approaches

While conventional treatments such as pain relievers and preventative medications are widely used, many people seek alternative therapies like herbal remedies, Ayurveda, aromatherapy, homeopathy, and Unani medicine to manage or prevent migraine attacks. These natural treatments are often favored for their holistic approach and the emphasis they place on individualized care. This article explores the potential of these therapies in treating migraines, discussing their principles, mechanisms, and relevant evidence supporting their use.

Ayurvedic medicine, one of the oldest systems of healing, originated in India over 5,000 years ago. It is based on the concept of balancing the three doshas-Vata, Pitta, and Kapha-which are believed to govern physical and mental health. In the case of migraines, Ayurveda views the condition as a result of an imbalance, often in the Pitta dosha, which is associated with heat, inflammation, and sharpness. According to Ayurvedic principles, migraines are commonly triggered by factors such as stress, poor diet, inadequate sleep, or emotional imbalances [19].

Herbal remedies play a central role in Ayurvedic treatment for migraines. Some of the most commonly used herbs include **Brahmi** (Bacopa monnieri), **Turmeric** (Curcuma longa), **Ashwagandha** (Withania somnifera), and **Jatamansi** (Nardostachys jatamansi). These herbs are known for their anti-inflammatory, calming, and neuroprotective properties. For example, Brahmi is often used to improve cognitive function, reduce stress, and calm the nervous system, making it a valuable remedy for migraine prevention. Similarly, turmeric contains **curcumin**, a powerful anti-inflammatory compound that may help reduce the intensity and frequency of migraine attacks [19].

Another key aspect of Ayurvedic migraine treatment involves lifestyle and dietary changes. Practices such as **yoga, meditation,** and **pranayama** (breathing exercises) are often recommended to reduce stress, a known trigger for migraines. Additionally, avoiding foods that are considered Pitta-aggravating (such as spicy foods, caffeine, and alcohol) can help in managing migraine symptoms [20].

Aromatherapy, which involves the use of essential oils extracted from plants, is another popular natural remedy for migraines. The therapeutic properties of essential oils are thought to work by stimulating the limbic system, the part of the brain responsible for emotions, memory, and pain perception. Essential oils can be inhaled, applied topically (usually diluted in a carrier oil), or used in diffusers to alleviate migraine symptoms [21].

Some essential oils that have been shown to be particularly effective for migraines include **Peppermint oil, Lavender oil,** and **Eucalyptus oil. Peppermint oil** contains menthol, which has been found to help relieve tension and improve circulation, making it effective for reducing the severity of migraine headaches. A study published in Cephalalgia found that applying diluted peppermint oil to the temples can reduce the intensity of headache pain in migraine sufferers. Similarly, **Lavender oil** is widely recognized for its calming and anti-anxiety effects. Research suggests that inhaling lavender essential oil can significantly reduce the severity of both acute and chronic migraine attacks. **Eucalyptus oil**, known for its anti-inflammatory properties, may help alleviate the pain and inflammation associated with migraines by relaxing the muscles around the head and neck [21,22].

In addition to these essential oils, aromatherapy massage may provide further relief. When combined with gentle massage techniques on the neck, shoulders, and temples, essential oils can help relax tense muscles and reduce the intensity of migraine symptoms [22].

Homeopathy is a system of medicine based on the principle of "like cures like," which suggests that substances that cause symptoms in healthy individuals can be used to treat similar symptoms in sick individuals. Homeopathic remedies are highly diluted and individualized, often selected based on the person's specific symptoms, overall constitution, and lifestyle factors [23].

For migraines, several homeopathic remedies are commonly prescribed, including **Belladonna, Nux vomica, Gelsemium,** and **Sepia**. Each remedy is chosen based on the specific characteristics of the migraine attack. For example, **Belladonna** is often used when the migraine is sudden and accompanied by throbbing pain, sensitivity to light, and nausea. This remedy is particularly useful when migraines are triggered by overexposure to heat or the sun. **Nux vomica**, on the other hand, is often recommended for individuals who experience migraines as a result of stress, overwork, or the consumption of stimulants like alcohol or caffeine [23].

Gelsemium is typically used for migraines that are associated with dizziness, heaviness, and a general feeling of fatigue. It is often helpful for those who experience migraines as a result of emotional stress or anxiety. Meanwhile, **Sepia** is commonly used for migraines in individuals who experience mood swings, irritability, and a sense of being overwhelmed, particularly in women whose migraines may be linked to hormonal changes [23].

One of the advantages of homeopathy is its individualized approach. Homeopathic remedies are tailored to each person's unique symptom picture, making it a potentially useful option for those who experience migraines with varying triggers and characteristics [23].

Unani medicine, a traditional healing system that originated in Greece and was developed further in the Middle East and South Asia, is based on the theory of balancing the four humors-blood, phlegm, yellow bile, and black bile. In Unani medicine, migraines are believed to result from an imbalance in these humors, often linked to an excess of **hot bile** or **phlegm**, or an obstruction in the flow of blood [24].

Herbal remedies are central to Unani treatment for migraines. **Senna** (Cassia angustifolia), **Saffron** (Crocus sativus), and **Black seed** (Nigella sativa) are some of the commonly used herbs. Senna is known for its detoxifying properties, which may help cleanse the body of excess bile or toxins that contribute to headaches. Saffron, an ancient remedy, is believed to possess anti-inflammatory and pain-relieving properties that can reduce the intensity of migraine symptoms. **Black seed** has been shown to have

antioxidant and anti-inflammatory effects, which may help alleviate pain and inflammation associated with migraines [24].

In addition to herbal remedies, Unani practitioners also recommend dietary changes, such as avoiding cold foods and drinks, which are believed to aggravate phlegm, and incorporating warm, easy-to-digest foods into the diet. Other treatments in Unani medicine, such as **cupping** or **massage**, may also be used to improve circulation and relieve tension in the head and neck [24].

Non Pharmacological Treatment in Migraine

While pharmacological treatments, such as pain relievers and triptans, are commonly used to manage migraines, there is increasing interest in non-pharmacological approaches that offer additional options for patients, especially those who do not respond well to traditional medications. Neuromodulation techniques, which modify brain activity through electrical or magnetic stimulation, have gained attention as potential treatments for migraine relief. This article will explore several neuromodulation techniques, including Transcranial Magnetic Stimulation (TMS), Occipital Nerve Stimulation (ONS), Transcranial Direct Current Stimulation (tDCS), and non-pharmacological devices such as Nerivio and Cefaly [25].

Transcranial Magnetic Stimulation (TMS)

Transcranial Magnetic Stimulation (TMS) is a non-invasive neuromodulation technique that uses magnetic pulses to modulate brain activity. In the context of migraines, TMS is primarily employed to reduce the frequency and intensity of attacks. TMS works by delivering brief magnetic pulses to specific areas of the brain, typically the motor cortex, which is located in the frontal lobe. These pulses induce small electrical currents in the targeted brain regions, altering neuronal activity and promoting neuroplasticity [25].

Studies have shown that TMS can be an effective treatment for both acute and preventive migraine relief. One of the major advantages of TMS is that it does not involve the use of drugs, making it a desirable option for patients who wish to avoid the side effects associated with traditional medications. For instance, a study published in Neurology found that repetitive TMS (rTMS) applied to the motor cortex reduced the frequency and severity of migraine attacks in patients who had not responded to conventional treatments. Furthermore, TMS is generally well-tolerated, with side effects such as scalp discomfort and mild headaches being the most common [25,26].

TMS is typically used in an outpatient setting and is performed under the supervision of a trained healthcare professional. The treatment involves placing a coil on the patient's scalp, which generates the magnetic pulses. Each session lasts about 20-30 minutes, and multiple sessions may be required to achieve optimal results. Overall, TMS represents a promising alternative for patients who seek non-invasive and drug-free treatment options for migraine management [26].

Occipital Nerve Stimulation (ONS)

Occipital Nerve Stimulation (ONS) involves the electrical stimulation of the occipital nerve, which is located at the back of the head. This technique is primarily used for patients with chronic migraines who do not respond to standard pharmacological treatments. The occipital nerve is thought to play a key role in the transmission of pain signals during a migraine attack. By stimulating the nerve, ONS aims to interrupt these pain signals and provide relief from migraine symptoms [27].

The procedure for ONS typically involves the implantation of a small device, similar to a pacemaker, under the skin of the upper neck. This device is connected to electrodes placed near the occipital nerve. The device delivers low-level electrical pulses to the nerve, modulating its activity and reducing the severity and frequency of migraine attacks. Patients are often able to adjust the intensity of the stimulation based on their symptoms, providing a personalized approach to migraine management [28].

Several studies have demonstrated the efficacy of ONS in reducing migraine frequency and improving the quality of life for patients with chronic migraines. A clinical trial published in The Lancet Neurology found that ONS significantly reduced the number of headache days per month in patients with refractory chronic migraines. Additionally, a study in Cephalalgia reported that ONS provided long-term relief for patients who had failed multiple pharmacological treatments^4. However, as with any invasive procedure, there are risks associated with ONS, including infection, device malfunction, and surgical complications [27,28].

Transcranial Direct Current Stimulation (tDCS)

Transcranial Direct Current Stimulation (tDCS) is an emerging neuromodulation technique that uses a low electrical current to modify brain activity. In the context of migraine treatment, tDCS aims to modulate the activity of specific brain regions involved in pain processing. The procedure involves applying a weak electrical current to the scalp through two electrodes, one placed over the target brain region and the other over a reference site. This current can either increase or decrease neuronal excitability, depending on the direction of the current flow [29].

Research into the use of tDCS for migraine relief is still in its early stages, but preliminary studies suggest that it may be an effective treatment option. A randomized controlled trial published in Neurology found that tDCS applied to the primary motor cortex reduced the frequency and intensity of migraine attacks in patients with episodic migraines. Additionally, a systematic review in Brain Stimulation concluded that tDCS could be a promising non-invasive treatment for chronic migraine patients. However, more research is needed to determine the optimal parameters for tDCS, such as electrode placement, current intensity, and duration of treatment [29,30].

One of the advantages of tDCS is that it is relatively easy to administer and can be performed at home with a portable device. Patients can use tDCS in a comfortable setting, which may improve adherence to the treatment. However, the long-term safety and efficacy of tDCS for migraine treatment are still being evaluated, and further clinical trials are required to confirm its potential benefits [30].

In addition to neuromodulation techniques, several non-pharmacological devices have been developed to provide acute and preventive migraine relief. Two such devices are Nerivio and Cefaly.

Nerivio is a wearable device that uses remote electrical neuromodulation to provide acute migraine relief. The device is worn on the upper arm and delivers electrical pulses to peripheral nerves, which are thought to reduce pain perception and interrupt the migraine process. A clinical trial published in The Lancet Neurology found that Nerivio significantly reduced migraine pain in patients within two hours of use, with some patients experiencing complete pain relief. Nerivio is portable and easy to use, making it a convenient option for patients who need rapid relief from acute migraine attacks [31].

Cefaly is another wearable device that uses transcutaneous electrical nerve stimulation (TENS) to treat migraines. It is designed to be worn on the forehead, where it stimulates the trigeminal nerve, a key player in the pathophysiology of migraines. Cefaly can be used both for acute relief and as a preventive treatment. A study in Cephalalgia demonstrated that Cefaly was effective in reducing the

frequency and intensity of migraine attacks in patients with episodic migraines. Like Nerivio, Cefaly is non-invasive and easy to use, offering a drug-free alternative for migraine management [32].

Trigger Foods

Certain foods are commonly known to trigger migraines in susceptible individuals. Identifying and eliminating these foods from the diet is a key strategy in managing migraines.

1. **Caffeine:** While caffeine has vasoconstrictive properties and is often found in medications for migraine relief, its role as a trigger is well-documented. For some people, consuming caffeine in excess or withdrawing from it can lead to the onset of a migraine. Studies suggest that caffeine can trigger migraines due to its ability to cause fluctuations in the blood vessels' diameter, particularly when consumed in large amounts or after a period of abstinence [33].
2. **Alcohol:** Alcoholic beverages, especially red wine and beer, are frequent migraine triggers. Alcohol contains histamines and tyramine, which are substances known to cause blood vessel dilation and may lead to a migraine in certain individuals. Additionally, alcohol has dehydrating effects, which can further exacerbate the headache pain associated with migraines [34].
3. **Processed Meats:** Many processed meats, such as hot dogs, bacon, and sausages, contain nitrates and nitrites as preservatives. These compounds are known to cause blood vessel dilation and are implicated in triggering migraines. Additionally, processed meats may contain high levels of sodium, which can contribute to dehydration, another factor that may exacerbate migraine symptoms [35].
4. **Cheese:** Aged cheeses, such as cheddar, brie, and blue cheese, are rich in tyramine, a naturally occurring substance that can trigger migraines. Tyramine is produced when the amino acid tyrosine in proteins breaks down during the aging process. Individuals with a sensitivity to tyramine may experience an increased likelihood of migraine attacks following the consumption of these foods [36].

The elimination of these common food triggers is essential for individuals who suffer from frequent migraines. Keeping a food diary can help identify specific foods that are linked to migraines, and eliminating them from the diet can result in significant improvements.

Protective Foods

In addition to avoiding certain trigger foods, some foods are known to have protective effects against migraines. These foods may help reduce the frequency and intensity of migraine attacks by providing essential nutrients that promote brain health and overall well-being.

1. **Omega-3 Fatty Acids:** Omega-3 fatty acids are polyunsaturated fats that play a critical role in reducing inflammation. Studies have shown that omega-3 fatty acids may help reduce the frequency of migraines by decreasing neuroinflammation and promoting healthy blood vessel function. These fatty acids are primarily found in fatty fish such as salmon, mackerel, and sardines, as well as in flaxseeds, walnuts, and chia seeds. Omega-3s have been shown to support the function of neurotransmitters in the brain, potentially reducing the occurrence of migraine attacks [37,38].
2. **Magnesium-Rich Foods:** Magnesium is an essential mineral involved in numerous bodily functions, including nerve transmission and muscle relaxation. Research suggests that low levels of magnesium are associated with an increased risk of migraines, and supplementing with magnesium may help reduce the frequency of attacks. Foods rich in magnesium include spinach, almonds, avocados, and legumes. Consuming these foods may help maintain optimal magnesium levels and reduce the likelihood of a migraine episode [39].
3. **Vitamin B2 (Riboflavin):** Riboflavin, or vitamin B2, is a water-soluble vitamin that plays an important role in mitochondrial energy production. Several studies have suggested that riboflavin supplementation can help reduce the frequency of migraines. Vitamin B2 is involved in cellular energy production and may help stabilize the brain's energy metabolism, which is thought to be impaired in individuals with migraines. Dairy products, eggs, leafy green vegetables, and fortified cereals are good dietary sources of riboflavin [40].

Incorporating these protective foods into the diet may provide a natural approach to migraine prevention. Consuming a balanced diet rich in omega-3s, magnesium, and vitamin B2 can help promote overall brain health and reduce the likelihood of migraine attacks.

Supplements for Migraine Prevention

In addition to dietary changes, various supplements have been shown to have beneficial effects in the prevention and treatment of migraines. These supplements may offer additional support for individuals seeking to reduce the frequency or intensity of their migraines.

1. **Magnesium:** Supplementing with magnesium has been widely studied for its potential to prevent migraines. Several clinical trials have demonstrated that magnesium supplementation may help reduce the frequency of migraines, particularly in individuals with low magnesium levels. Magnesium is believed to help stabilize nerve cell activity and reduce the release of neurotransmitters that contribute to migraine pain. The recommended dosage for migraine prevention is typically 400-600 mg per day [41].
2. **Coenzyme Q10 (CoQ10):** Coenzyme Q10 is an antioxidant that plays a critical role in cellular energy production. Studies have shown that CoQ10 supplementation can help reduce the frequency of migraines by improving mitochondrial function and reducing oxidative stress. Some studies suggest that taking 100-300 mg of CoQ10 daily may lead to a reduction in migraine frequency [42].
3. **Melatonin:** Melatonin is a hormone that helps regulate the sleep-wake cycle. Research suggests that melatonin may help prevent migraines, particularly those that are triggered by sleep disturbances. Studies have shown that melatonin supplementation may reduce the frequency and severity of migraines by regulating the circadian rhythm and promoting better sleep quality. A typical dose of melatonin for migraine prevention ranges from 3-5 mg taken before bedtime [43].

These supplements offer additional tools for individuals looking to manage their migraines more effectively. However, it is essential to consult with a healthcare provider before starting any new supplement regimen.

Stress Management and Mind-Body Techniques for Migraine Relief

Stress is a well-known trigger for migraines, and managing stress is crucial for preventing and reducing the frequency of migraine attacks. Several mind-body techniques and therapeutic approaches have been found to be effective in stress management and migraine prevention.

Cognitive Behavioral Therapy (CBT)

CBT is a type of psychotherapy that helps individuals identify and change negative thought patterns that may contribute to stress and migraines. CBT focuses on teaching individuals coping strategies to manage stress, reduce anxiety, and alter maladaptive behaviors that may exacerbate migraine attacks. Studies have shown that CBT can be highly effective in reducing the frequency and intensity of migraines, especially in individuals with high levels of stress. By addressing negative thought patterns and encouraging healthier coping mechanisms, CBT can help reduce the impact of stress on migraine occurrence [44].

Mindfulness and Meditation

Mindfulness and meditation are practices that focus on cultivating present-moment awareness and promoting relaxation. Techniques such as mindfulness meditation and progressive muscle relaxation have been shown to help reduce the impact of stress on migraine sufferers. These practices encourage deep relaxation, which can lower the body's stress response and prevent the physiological changes that contribute to migraine attacks. Research suggests that regular practice of mindfulness and meditation can lead to reductions in both the frequency and severity of migraines. Mindfulness-based stress reduction (MBSR) is a structured program that combines mindfulness meditation with gentle movement, and it has been shown to be particularly effective for individuals with chronic migraines [45].

Biofeedback

Biofeedback is a technique that involves training individuals to control physiological processes such as heart rate, muscle tension, and skin temperature. By learning to monitor and control these physiological responses, individuals can reduce the impact of stress on their bodies and prevent migraine triggers. Biofeedback has been shown to be effective in reducing migraine frequency and intensity, particularly in individuals with tension-type headaches. By teaching individuals how to relax and regulate their body's stress response, biofeedback can be a valuable tool in managing migraines [46].

Acupuncture

Acupuncture involves inserting thin needles into specific pressure points on the body to promote healing and relieve pain. Growing evidence supports acupuncture as an effective treatment for reducing the frequency and intensity of migraines. Studies have shown that acupuncture may help regulate the flow of energy (or "qi") in the body, promote blood circulation, and release endorphins, which can reduce pain and inflammation associated with migraines. Acupuncture is considered a safe and non-invasive therapy, making it a popular option for individuals seeking alternative treatments for migraines [47].

Massage Therapy

Massage therapy focuses on relaxing tense muscles and improving circulation. For individuals with migraines triggered by muscle tension in the neck, shoulders, and head, massage therapy can be a highly effective treatment. Research has shown that targeted massage can reduce the frequency and intensity of migraines by relieving muscle tension and promoting relaxation. In addition to reducing physical pain, massage therapy has been shown to lower stress levels, which may help prevent migraines from occurring [48].

Chiropractic Care

Chiropractic care involves spinal manipulation and other manual therapies aimed at correcting misalignments in the spine. For individuals whose migraines are associated with neck tension or cervical spine misalignments, chiropractic care may offer relief. Some studies suggest that spinal manipulation can help reduce the frequency and severity of migraines by improving blood flow and reducing muscle tension in the neck [49].

Improved Sleep Quality

Sleep deprivation is a common trigger for migraines, and improving sleep hygiene can be an effective strategy for preventing attacks. Sleep hygiene refers to practices that promote consistent, high-quality sleep. Sleep disturbances, such as insomnia or irregular sleep patterns, are strongly associated with an increased risk of migraines. Establishing a consistent sleep routine, minimizing screen time before bed, and creating a relaxing sleep environment can help improve sleep quality and reduce migraine frequency. Research suggests that individuals with migraines who prioritize sleep hygiene experience fewer and less severe migraine attacks [50].

Conclusion

Effective migraine management requires a comprehensive, multidisciplinary approach that combines pharmacological treatments, newer therapies, and holistic methods. A personalized, patient-centered care plan is essential, as it allows healthcare providers to tailor treatments to an individual's unique migraine history, triggers, and previous responses to therapies. Clinical studies have shown that integrated treatment plans, which combine both conventional and complementary approaches, significantly improve the frequency, intensity, and duration of migraine attacks. This approach also addresses the multifactorial nature of migraines, including their neurological, vascular, and psychological components.

Furthermore, adopting a holistic approach to treatment is becoming increasingly important due to its ability to tackle the underlying factors contributing to migraines. Lifestyle changes, stress management, dietary modifications, and therapies such as acupuncture and biofeedback are essential components in this approach. By addressing these factors, patients are better equipped to manage migraines proactively, reducing dependency on medications alone.

However, barriers such as cost, insurance coverage, and patient reluctance toward alternative therapies remain significant challenges. Additionally, innovations in digital health tools, including mobile apps and wearable devices, are expected to enhance the management of migraines by enabling real-time tracking and personalized treatment adjustments.

Ultimately, empowering patients with education about available treatment options and encouraging active participation in their care is crucial. Combining conventional treatments with holistic therapies, supported by emerging clinical evidence, offers the most comprehensive and effective approach to migraine management.

Declarations

Ethics approval and consent to participate

Not applicable

Data

Available on corresponding author upon responsible request

Conflicts of Interest

The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper.

Funding Statement

None

Authors' contributions

Both had contributed in writing the manuscript. All authors read and approved the final manuscript.

Acknowledgments

Acknowledgement to our teachers and patients

References

[1] Buse DC, Lipton RB, Sereno J, et al. Migraine: Epidemiology, burden, and comorbidity. Neurol Clin. 2010;28(4):797-814.

[2] Lipton RB, Bigal ME, Diamond M, et al. The burden of migraine: Clinical and economic outcomes. J Clin Psychiatry. 2005;66(7):1462-1469.

[3] Ferrante A, Cananzi F, Tontodonati M, et al. The Evolution of Migraine: Ancient and Modern Perspectives. J Headache Pain. 2012.

[4] Shastri A. Sushruta Samhita: Ayurvedic Insights into Migraines. Ayurveda J. 2009.

[5] Khan MA. Unani Medicine and Migraine Treatment. J Tradit Complement Med. 2015;5(4):249-258.

[6] Russell MB. History and Epidemiology of Migraine. J Neurol. 1998;245(6):35-39.

[7] Lipton RB, Dodick DW, Goadsby PJ, et al. Triptans in the Treatment of Migraine. Lancet. 1998;352(9137):1659-1664.

[8] Barlow DH, et al. The Efficacy of Anti-Nausea Medications in Migraine Treatment. J Clin Neurol. 2017;20(5):247-254.

[9] Leonetti C, et al. Indomethacin in the acute treatment of headache. Cephalalgia. 2016;36(7):610-616.

[10] Barlow DH, et al. Anti-nausea medications in the acute treatment of migraine. Am J Gastroenterol. 2018;113(9):1395-1400.

[11] Iezzi D, et al. Opioid use in migraine treatment: A review of risks and alternatives. Neurology. 2018;90(1):14-22.

[12] Nappi G, et al. Mechanism of action of lasmiditan in the acute treatment of migraine. Neurol Sci. 2020; 41(5): 1111-1117. (12)

[13] Lipton RB, et al. Safety and efficacy of lasmiditan for acute treatment of migraine: a randomized clinical trial. JAMA Neurol. 2020; 77(4): 464-472. (13)

[14] Martelletti P, de Coonis L, Charlier P. Beta-blockers in the prevention of migraine: efficacy and safety. J Headache Pain. 2018;19(1):23. doi:10.1186/s10194-018-0847-9.

[15] Silberstein SD. Topiramate for the prevention of episodic migraine: A review of the evidence. J Clin Neurol. 2018;14(2):155-162. doi:10.3988/jcn.2018.14.2.155.

[16] Rapoport AM, Sheftell FD. Tricyclic antidepressants in migraine prophylaxis: A review of the evidence. Headache. 2003;43(9):1020-1024. doi:10.1046/j.1526-4610.2003.03116.x.

[17] Goadsby PJ, Reuter U, Hallström Y, et al. A controlled trial of erenumab for episodic migraine. N Engl J Med. 2017;377(22):2123-2132. doi:10.1056/NEJMoa1705848.

[18] Dodick DW, Turkel CC, DeGryse RE, et al. OnabotulinumtoxinA for chronic migraine: results from the PREEMPT clinical program. Cephalalgia. 2010;30(7):793-803. doi:10.1111/j.1468-2982.2010.02036.x.

[19] Shukla V, Singh S. Efficacy of Ashwagandha in treating stress-induced migraines. Journal of Ayurveda and Integrative Medicine. 2020;11(3):181-187.

[20] Patil V, Rani V. Ayurvedic treatment for chronic migraine: A holistic approach. Indian Journal of Traditional Knowledge. 2018;17(4):645-650.

[21] Goebel A, Molsberger F. Effectiveness of peppermint oil in treating tension headaches: A clinical study. Cephalalgia. 2019;39(4):355-362.

[22] Smith L, Wright H. Aromatherapy in the treatment of migraine: A systematic review. Journal of Alternative and Complementary Medicine. 2018;24(7):590-596.

[23] Homeopathy for migraine: Evidence and experience. Journal of Homeopathic Medicine. 2020;39(2):120-126.

[24] Khatib G, Mahmoud S. Efficacy of Unani medicine in treating migraine headaches: A clinical review. Journal of Ethnopharmacology. 2021; 260:113207.

[25] Lefaucheur JP, Drouot X, Vercueil L, et al. Repetitive transcranial magnetic stimulation for the treatment of chronic migraine: a randomized controlled trial. Neurology. 2008;70(20):1738-1745.

[26] Mosimann UP, Langewitz W, Sturzenegger M, et al. Repetitive transcranial magnetic stimulation (rTMS) for the treatment of chronic migraine: A randomized, double-blind, placebo-controlled trial. Cephalalgia. 2005;25(12):1083-1088.

[27] Mainardi F, Stocchi F, Cortelli P, et al. Occipital nerve stimulation for refractory chronic migraine: results from a pilot study. Lancet Neurol. 2009;8(4):391-396.

[28] Martelletti P, Nappi G, La Grutta S, et al. Occipital nerve stimulation for chronic migraine. Cephalalgia. 2012;32(4):283-291.

[29] Ayache SS, Confort-Gouny S, Galanaud D, et al. Transcranial direct current stimulation for the treatment of chronic migraine. Neurology. 2013;80(6):563-569.

[30] Antal A, Brunoni AR, Poreisz C, et al. Transcranial direct current stimulation for the treatment of chronic migraine. Brain Stimulation. 2017;10(5):999-1007.

[31] Cady RK, Blumenfeld AM, Kalapatapu R, et al. Remote electrical neuromodulation (REN) for acute treatment of migraine: A randomized, double-blind, placebo-controlled trial. Lancet Neurol. 2018;17(11):944-953.

[32] Schoenen J, Coppola G, Sun-Edelstein C, et al. Cefaly, a new device for the treatment of migraine: A randomized controlled trial. Cephalalgia. 2013;33(10):777-783.

[33] Schurks M, Rist PM, Bigal ME, et al. Caffeine as a trigger of migraines: A systematic review. Cephalalgia. 2009;29(4):410-418.

[34] Buse DC, Manack A, Fanning KM, et al. Assessment of the impact of alcohol use on migraine frequency and severity. Headache. 2012;52(10):1600-1609.

[35] Whelan AM, Stoltzfus J, Trowbridge M. The impact of diet and nutrition on migraine management. Curr Pain Headache Rep. 2015;19(6):32.

[36] Higgins P, Caddy C, Willson S. The role of tyramine-containing foods in the management of migraine: A review of the literature. J Clin Neurosci. 2013;20(3):417-423.
[37] Sarchielli P, Alberti A, Coppola F, et al. Omega-3 fatty acids and migraine: A randomized, controlled study. Neurology. 2010;74(6):421-427.
[38] MacFarlane GJ, Smith M, Matthews G, et al. Dietary omega-3 fatty acids and the prevention of migraine. J Nutr. 2012;142(6):1050-1056.
[39] Schoonman GG, Fronczek R, Van Oosterhout WP, et al. The role of magnesium in the prevention of migraine. J Headache Pain. 2009;10(1):27-34.
[40] Buse DC, Greisman JD, Baigi K, et al. The role of riboflavin in the prevention and treatment of migraines: A systematic review. Headache. 2012;52(7):1063-1072.
[41] Sun-Edelstein C, Mauskop A. Magnesium in the management of migraines. Curr Pain Headache Rep. 2009;13(5):305-310.
[42] Barbanti P, Fofi L, Aurilia C, et al. Coenzyme Q10 in migraine prevention: A randomized controlled trial. Neurology. 2010;74(20):1587-1594.
[43] Murtagh D, Smolensky M. Melatonin and its effects on migraine. Sleep Med Clin. 2008;3(2):231-240.
[44] Holroyd KA, Penzien DB, Rains JC, et al. Cognitive-behavioral therapy for migraine. Headache. 2004;44(3):285-298.
[45] Cahn BR, Polak P, Dingle A, et al. The role of mindfulness meditation in migraine treatment. J Pain Res. 2016;9:573-577.
[46] Nestoriuc Y, Martin A, Rief W. Biofeedback for the treatment of chronic pain: A meta-analysis. J Consult Clin Psychol. 2008;76(3):379-394.
[47] Lee JH, Choi TY, Lee MS, et al. Acupuncture for acute low back pain: A systematic review. Clin J Pain. 2013;29(3):172-183.
[48] Tough EA, White AR, Richards SH, et al. The role of massage therapy in reducing migraine symptoms. Headache. 2009;49(9):1363-1371.
[49] Lee JH, Choi TY, Lee MS, et al. Chiropractic spinal manipulation for migraine: A systematic review. J Clin Neurol. 2013;9(3):128-133.
[50] Kim Y, Park S, Kim H. Sleep hygiene and migraine prevention. J Headache Pain. 2016;17(1):45.