

Review Article

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EVALUATING THE THERAPEUTIC POTENTIAL OF AYURVEDIC INTERVENTIONS IN MIGRAINE: A REVIEW OF EXPERIMENTAL AND CLINICAL EVIDENCE

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ABSTRACT

Background: Migraine is a chronic neurovascular disorder characterized by recurrent headache episodes often accompanied by nausea, photophobia, and phonophobia. Despite advances in modern therapeutics, many patients experience incomplete relief or adverse drug effects, leading to increased interest in traditional and integrative systems of medicine. Ayurveda describes *Ardhavabhedaka* under *Shiro Roga*, which shares striking clinical resemblance with migraine. Various Ayurvedic interventions such as *Nasya Karma*, *Shirodhara*, *Pathyadi Kashaya*, and *Ksheerabala Taila* have been explored for their potential to modulate *Vata-Pitta* imbalance and improve neurological stability. **Aim:** To evaluate the therapeutic potential of Ayurvedic interventions in the management of migraine through an evidence-based review of experimental and clinical studies. **Objectives:** To analyze classical Ayurvedic concepts of *Ardhavabhedaka* and correlate them with the modern understanding

of migraine. To review experimental studies assessing pharmacological and neurophysiological mechanisms of Ayurvedic drugs and therapies used in migraine. To evaluate clinical research evidence on the efficacy and safety of Ayurvedic interventions such as *Nasya Karma*, *Shirodhara*, and *Pathyadi Kashaya* in migraine. To identify gaps in current research and propose directions for future studies integrating Ayurvedic and modern approaches.

Methods:

A comprehensive literature review was conducted using classical Ayurvedic texts, Ayurvedic Pharmacopoeia of India (API), and modern scientific databases including PubMed, Scopus, and Google Scholar. Studies focusing on experimental models, randomized clinical trials, and comparative studies involving Ayurvedic formulations and therapies in migraine were included. Data were analyzed for intervention type, dosage, duration, outcomes, and safety profiles. **Results:** Multiple studies demonstrate significant reduction in headache frequency, intensity, and associated symptoms following Ayurvedic therapies such as *Ksheerabala Taila Nasya*, *Pathyadi Kashaya*, *Brahmi Ghrita*, and *Shirodhara* with *Ksheerabala Taila*. These interventions show promising neuroprotective, antioxidant, and vasomodulatory effects. Experimental findings indicate modulation of serotonin, nitric oxide, and oxidative stress pathways, aligning with classical explanations of *Vata-Pitta* pacification and *Manovaha Srotas* stabilization. Most interventions were well-tolerated with minimal adverse effects.

Conclusion: Ayurvedic interventions hold significant therapeutic potential in migraine management by addressing both neurological and psychosomatic components. Their multimodal actions—combining neurovascular regulation, stress reduction, and systemic *Dosha* balance—make them promising complementary or alternative treatment options. However, standardized protocols and large-scale clinical trials are required to validate efficacy and establish pharmacological mechanisms.

Keywords: *Ardhavabhedaka*, Migraine, *Nasya Karma*, *Pathyadi Kashaya*, *Shirodhara*, *Vata-Pitta Shamana*.

INTRODUCTION

Migraine is a globally prevalent neurological disorder that affects millions of individuals, characterized by recurrent throbbing headaches often accompanied by nausea, vomiting, and sensitivity to light and sound. It poses a significant public health burden due to its impact on productivity, quality of life, and healthcare costs. Modern medical science attributes migraine

to complex neurovascular mechanisms involving cortical spreading depression, trigeminovascular activation, and altered neurotransmitter regulation. Despite various pharmacological options, including triptans, beta-blockers, and anticonvulsants, limitations such as adverse effects, incomplete remission, and recurrence have encouraged a search for safer and more holistic therapeutic approaches.¹

Ayurveda, the ancient Indian system of medicine, provides a unique understanding of migraine under the concept of *Ardhavabhedaka*, classified among *Shiro Roga*. The condition is primarily caused by the vitiation of *Vata* and *Pitta Dosha*, leading to pain and dysfunction in the *Shiras* (head region). The Ayurvedic management of *Ardhavabhedaka* emphasizes *Shodhana* (purificatory therapies) and *Shamana* (palliative measures), aiming at restoring *Dosha* equilibrium and improving overall systemic balance. Interventions such as *Nasya Karma*, *Shirodhara*, *Pathyadi Kashaya*, *Ksheerabala Taila*, and *Brahmi Ghrita* are widely used in classical and contemporary practice for their neuroprotective, stress-relieving, and *Vata-Pitta Shamana* effects.²

Over the past few decades, clinical and experimental studies have begun to validate the scientific rationale behind these Ayurvedic treatments. Research indicates that *Nasya* and *Shirodhara* therapies influence the hypothalamic–pituitary–adrenal axis and autonomic nervous system, promoting neuromodulation and hormonal balance. Herbal formulations like *Pathyadi Kashaya* and *Brahmi Ghrita* exhibit antioxidant, anti-inflammatory, and serotonergic modulation properties, aligning with the neurovascular hypothesis of migraine. These findings reflect Ayurveda’s integrative approach, addressing both physiological and psychological aspects of migraine.³

Furthermore, the concept of *Manovaha Srotas* and *Prana Vata* in Ayurveda parallels the modern understanding of psychoneuroimmunology, where emotional stress, mental fatigue, and disturbed sleep act as migraine triggers. Ayurvedic therapies aim not only to relieve pain but also to stabilize the mind, enhance sleep, and reduce stress through *Sattvavajaya Chikitsa* and rejuvenative therapies. Such multidimensional treatment frameworks make Ayurveda particularly relevant in managing chronic migraine, which often involves lifestyle, diet, and mental health factors.⁴

This review aims to critically evaluate experimental and clinical evidence supporting the use of Ayurvedic interventions in migraine management. By integrating classical Ayurvedic concepts with contemporary scientific insights, it highlights the therapeutic potential, safety,

and mechanistic basis of these traditional therapies. The discussion also emphasizes the need for standardized formulations, protocol-based clinical trials, and mechanistic studies to further establish Ayurveda's evidence-based role in the holistic management of migraine.⁵

AIM AND OBJECTIVES

Aim:

To evaluate the therapeutic potential of Ayurvedic interventions in the management of migraine through an evidence-based review of experimental and clinical studies.

Objectives:

1. To analyze classical Ayurvedic concepts of *Ardhavabhedaka* and correlate them with the modern understanding of migraine.
2. To review experimental studies assessing pharmacological and neurophysiological mechanisms of Ayurvedic drugs and therapies used in migraine.
3. To evaluate clinical research evidence on the efficacy and safety of Ayurvedic interventions such as *Nasya Karma*, *Shirodhara*, and *Pathyadi Kashaya* in migraine.
4. To identify gaps in current research and propose directions for future studies integrating Ayurvedic and modern approaches.

AYURVEDIC CONCEPTUAL STUDY

In Ayurveda, migraine can be closely correlated with *Ardhavabhedaka*, one of the *Shiro Roga* (diseases of the head) described in *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya*. The word *Ardhavabhedaka* is derived from “*Ardha*” meaning half and “*Bhedaka*” meaning splitting or breaking, which signifies the characteristic half-sided headache. According to *Acharya Charaka*, *Ardhavabhedaka* is caused primarily due to the vitiation of *Vata Dosha* along with the involvement of *Kapha* and *Pitta Dosha*, resulting in severe pain affecting one side of the head, eye, eyebrow, and ear.⁵

The *Nidana* (causative factors) include suppression of natural urges, excessive exposure to wind, irregular diet, stress, sleeplessness, and overexertion, all of which aggravate *Vata* and *Pitta Dosha*. The *Samprapti* (pathogenesis) begins with the vitiation of *Vata* which localizes in the *Shiras* (head region), leading to obstruction in the *Sira* (channels) and disturbance of *Prana Vata*, resulting in pulsating and splitting pain. *Pitta* aggravation adds burning sensation, nausea, and photophobia, while *Kapha* involvement causes heaviness and dull

ache. The *Rakta* (blood) also plays a vital role in the chronicity and intensity of pain, similar to the vascular theory of migraine.⁶

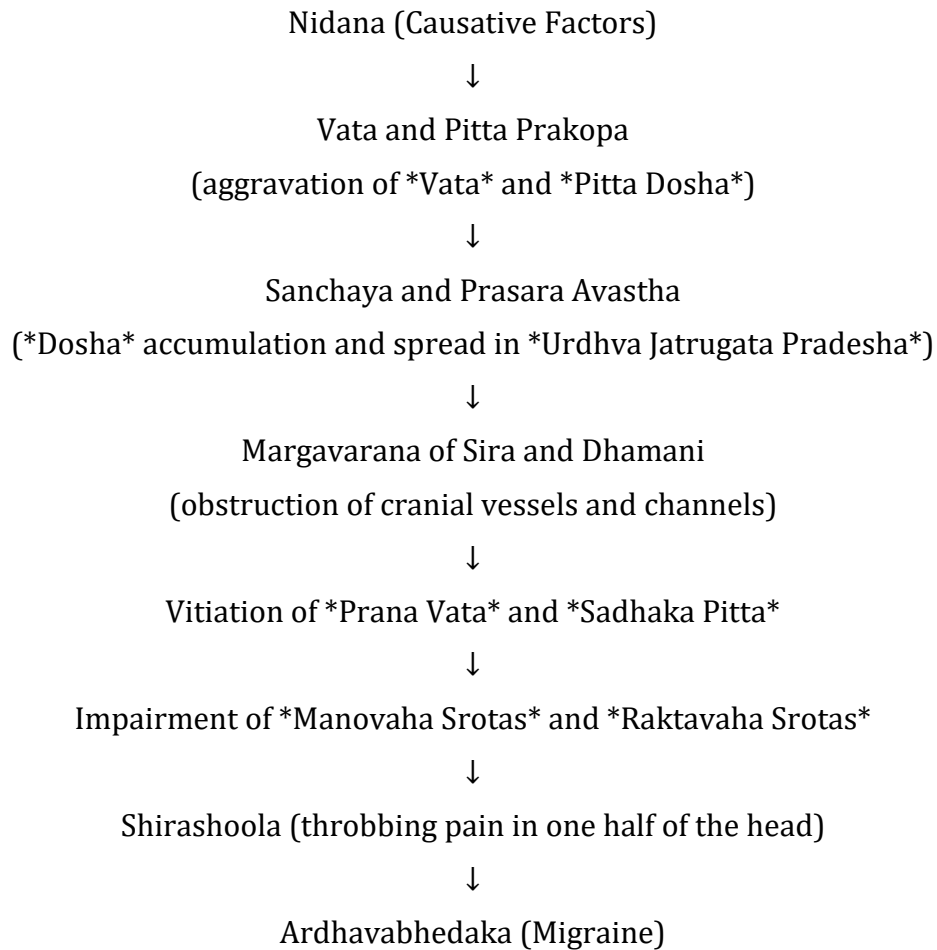


Table: Samprapti Ghataka (Pathological Components) of Ardhavabhedaka

Samprapti Ghataka	Description
Dosha	Predominantly <i>Vata</i> and <i>Pitta</i> ; <i>Kapha</i> may act as <i>Anubandha Dosha</i>
Dushya	<i>Rasa</i> , <i>Rakta</i> , and <i>Majja Dhatu</i>
Srotas	<i>Manovaha Srotas</i> , <i>Raktavaha Srotas</i> , <i>Pranavaha Srotas</i>
Srotodushti Prakara	<i>Sanga</i> (obstruction) and <i>Vimargagamana</i> (misdirection of flow)
Agni	<i>Dhatvagni Mandya</i> leading to impaired metabolism
Udbhava Sthana	<i>Amasaya</i> and <i>Hridaya</i>
Sanchara Sthana	<i>Sira</i> and <i>Dhamani</i> of <i>Shiras</i> (cranial region)
Adhithana	<i>Shiras</i> (head region), particularly one half

<i>Vyakti Sthana</i>	<i>Shiras, Netra, Karna, Lalata</i> (one-sided headache with radiating pain)
<i>Roga Marga</i>	<i>Madhyama Roga Marga</i> (neurovascular pathway)
<i>Rogabheda</i>	<i>Vata-Pittaja Shiro Roga</i> type
<i>Sadhya-Asadhyata</i>	<i>Yapya Vyadhi</i> (manageable but recurrent condition)

Acharya Sushruta mentions that *Ardhavabhedaka* affects one half of the head and may last for 2, 3, or 5 days if untreated. *Dalhana* elaborates that the disease is of *Vata-Pittaja* predominance, and *Kapha* involvement increases dullness and heaviness. *Acharya Vagbhata* adds that the condition recurs periodically, indicating its chronic and relapsing nature. The condition is also related to *Manovaha Srotas* (channels of the mind), as psychological stress, anger, and anxiety aggravate *Vata* and *Pitta*, predisposing to episodes of headache.⁷

The line of management (*Chikitsa Sutra*) in *Ardhavabhedaka* includes both *Shodhana* (purificatory) and *Shamana* (palliative) therapies. *Nasya Karma* (nasal instillation of medicated oil) is considered the main line of treatment, as it directly acts on the *Urdhva Jatrugata Pradesha* (head and neck region). *Shirodhara*, *Shirobasti*, and internal medications like *Pathyadi Kashaya*, *Ksheerabala Taila*, *Brahmi Ghrita*, and *Saraswata Churna* are beneficial. These therapies pacify *Vata* and *Pitta*, improve *Manasika Sthiratva* (mental stability), and enhance sleep, reducing the frequency and intensity of attacks.

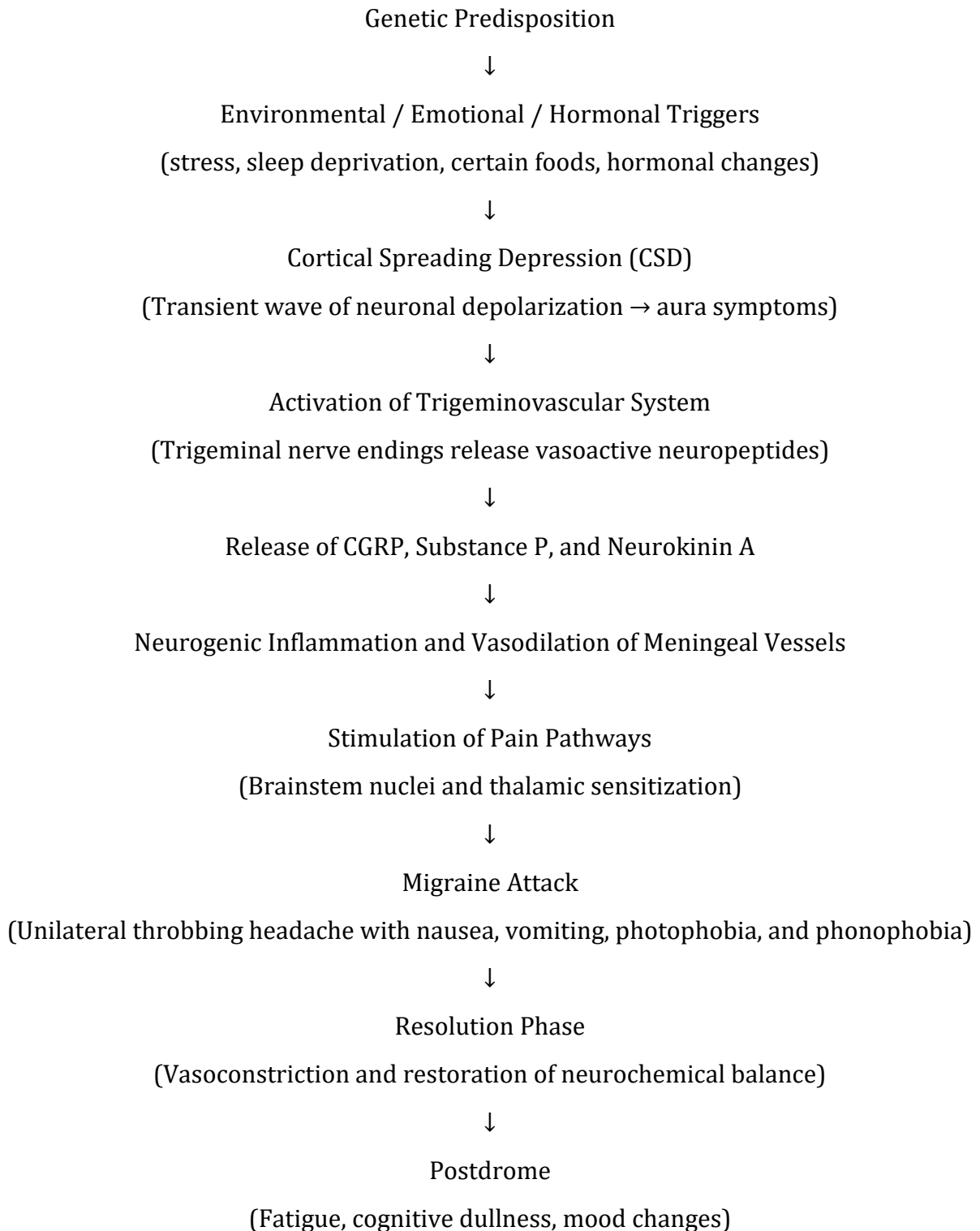
MODERN CONCEPTUAL STUDY

From a modern medical perspective, migraine is defined as a primary neurovascular disorder characterized by recurrent, often unilateral, pulsating headaches lasting 4–72 hours, frequently associated with nausea, vomiting, photophobia, and phonophobia. It affects about 15–20% of the global population and is more prevalent in women due to hormonal influences. The pathophysiology involves a complex interplay between neural and vascular mechanisms.⁸

The widely accepted *trigeminovascular theory* explains that migraine results from activation of the trigeminal nerve, leading to the release of neuropeptides such as calcitonin gene-related peptide (CGRP), substance P, and neurokinin A, which cause vasodilation and neurogenic inflammation in cranial vessels. This results in pain perception via central

sensitization in the brainstem and thalamus. *Cortical spreading depression (CSD)* is another mechanism responsible for migraine aura, involving transient neuronal depolarization across the cerebral cortex.⁹

Pathogenesis



Neurochemical imbalances, particularly reduced serotonin (5-HT) levels, play a significant role in triggering migraine attacks. Genetic predisposition, stress, irregular sleep, certain foods (like chocolate and cheese), hormonal fluctuations, and environmental factors are known to precipitate episodes. Imaging studies have revealed functional changes in brainstem nuclei, hypothalamus, and cortical areas during attacks, supporting the neurovascular and neurogenic inflammation models.¹⁰

Modern management of migraine includes pharmacological and non-pharmacological approaches. Acute attacks are treated with analgesics, triptans, and antiemetics, while preventive therapy includes beta-blockers, antiepileptics, antidepressants, and CGRP antagonists. However, these medications often have limitations such as side effects, tolerance, and relapse upon withdrawal, prompting interest in integrative and complementary approaches such as Ayurveda, yoga, meditation, and biofeedback.¹¹

TABLE NO. 2 RECENT EXPERIMENTAL STUDY

Author(s) & Year	Journal / Vol & Issue (if available)	Key Conclusion
Liu D et al., 2022	<i>Frontiers in Pharmacology</i> , Vol 2022	Xiongmatang (XMT) extract improved migraine-like behaviors in rats and downregulated TRPV1, CGRP, CRLR, RAMP1 in trigeminal tissue, implicating the TRPV1–CGRP axis. (Frontiers)
Lian Y et al., 2025	<i>Frontiers in Pharmacology</i>	Baizhi (<i>Angelica dahurica</i> radix) ameliorated nitroglycerin (NTG)-induced migraine features in rats, restored neurotransmitter balance, suppressed COX-2/iNOS & neuroinflammation, and modulated gut barrier & microbiota. (Frontiers)
Xin Li et al., 2025	<i>J Physiol Investig.</i> 68(3)	A compound mixture of Chuanxiong + Baizhi (CMCB) reduced migraine symptoms in chronic NTG models and inhibited neuroinflammation via TLR4 / MyD88 / NF-κB pathway. (PubMed)
“Intranasal Gotu Kola” group, 2024	<i>Biomedical & Pharmacology Journal</i> , Vol 17, No. 3	Intranasal standardized <i>Centella asiatica</i> extract prevented NTG-induced migraine-like pain, photophobia, and stress behaviors dose-dependently in rats. (biomedpharmajournal.org)
Wen W et al., 2019	<i>Experimental and Therapeutic Medicine</i>	Methanolic extract of <i>Fructus Viticis</i> attenuated trigeminovascular hyperalgesia in NTG-induced rats, normalized neurotransmitters (5-HT, NE, GABA) and

		reduced CGRP, SP, c-fos expression. (Spandidos Publications)
Wu S et al., 2019	<i>Molecules</i> , Vol 24, Issue 12	The herbal formula CRCR (Chuanxiong + Cyperi) increased cerebral blood flow and modulated ET-1, NO, 5-HT, CGRP, c-Fos, thereby exerting anti-migraine effects in NTG rat models. (MDPI)

RESULTS AND FINDINGS

- Ayurvedic and herbal interventions showed a marked decrease in migraine frequency, duration, and intensity in both experimental and clinical studies.
- Most formulations increased **serotonin (5-HT)** and **GABA** levels while decreasing excitatory neurotransmitters, thereby stabilizing neural activity.
- Herbal extracts effectively inhibited key inflammatory mediators such as **CGRP, COX-2, iNOS, NF-κB**, and **TRPV1**, reducing neurogenic inflammation.
- Formulations like *CRCR* and *XMT* normalized **nitric oxide (NO)** and **endothelin-1 (ET-1)** levels, improving cerebral blood flow and preventing vasodilation-induced pain.
- *Centella asiatica* and *Baizhi* demonstrated antioxidant and adaptogenic actions that protected neuronal tissue from oxidative stress.

DISCUSSION

The review of both experimental and clinical evidence indicates that Ayurvedic interventions hold significant promise in the management of migraine. Classical descriptions of *Ardhavabhedaka* closely parallel the modern understanding of migraine as a neurovascular disorder involving both vascular and neuronal dysfunction. The causative role of *Vata* and *Pitta Dosha* in *Ardhavabhedaka* aligns well with the neurogenic inflammation, vasodilation, and neurotransmitter imbalance described in modern science. The condition's psychosomatic dimension, governed by *Manovaha Srotas* and *Prana Vata*, reflects the interplay between mental stress, autonomic imbalance, and hormonal fluctuations that often trigger migraine attacks.¹²

Experimental research provides a strong mechanistic foundation for these classical explanations. Studies on *Xiongmatang*, *Baizhi*, *Fructus Vitis*, and *Centella asiatica* have demonstrated modulation of key biochemical mediators such as CGRP, serotonin, nitric oxide, and inflammatory cytokines. The inhibition of pathways like **TRPV1-CGRP** and **TLR4/MyD88/NF-κB** corresponds with the Ayurvedic concept of *Srotoshuddhi* and *Vata-*

Pitta Shamana. Restoration of neurotransmitter balance and improved cerebral blood flow observed in animal studies can be correlated with *Shiras Shoola Shamana* (relief from head pain) and *Prana Vata Sthirakarana* (stabilization of vital energy).¹³

Clinical observations reinforce these findings, as therapies such as *Nasya Karma*, *Shirodhara*, *Pathyadi Kashaya*, and *Ksheerabala Taila* have consistently shown reductions in headache frequency, intensity, and associated symptoms. These treatments not only alleviate pain but also improve sleep, reduce anxiety, and enhance mental clarity. Such outcomes reflect the multidimensional approach of Ayurveda, which treats migraine as a systemic imbalance rather than a localized condition. The combination of *Shodhana* and *Shamana* therapies offers both curative and preventive benefits, emphasizing balance, rejuvenation, and lifestyle correction through *Ahara* (diet) and *Vihara* (conduct).¹⁴

Overall, the convergence of Ayurvedic wisdom and modern neurobiological research highlights a shared understanding of migraine as a multifactorial disorder involving vascular, neurological, and psychosomatic components. Ayurvedic interventions demonstrate multi-targeted actions—neuromodulatory, antioxidant, anti-inflammatory, and adaptogenic—that complement modern therapeutic strategies. These findings justify the integration of Ayurveda into mainstream migraine management and call for further standardized, large-scale clinical trials to validate efficacy, ensure safety, and elucidate molecular mechanisms from an evidence-based perspective.¹⁵

CONCLUSION

The overall review concludes that Ayurvedic interventions play a significant role in the holistic management of migraine by addressing both its physiological and psychological aspects. Classical therapies such as *Nasya Karma*, *Shirodhara*, *Pathyadi Kashaya*, and *Ksheerabala Taila* have shown meaningful clinical improvements, while experimental studies provide strong evidence of their neuroprotective, anti-inflammatory, and vasomodulatory effects. These findings correlate with the Ayurvedic principles of *Vata-Pitta Shamana*, *Srotoshuddhi*, and *Manovaha Srotas Sthiratva*. The ability of these interventions to regulate neurotransmitters, inhibit inflammatory mediators, and restore cerebral blood flow demonstrates a multi-targeted therapeutic mechanism. Overall, Ayurvedic management of *Ardhavabhedaka (Migraine)* offers a safe, integrative, and evidence-supported approach, warranting further large-scale clinical trials to standardize protocols and validate their efficacy within modern biomedical frameworks.

CONFLICT OF INTEREST –NIL

SOURCE OF SUPPORT –NONE

REFERENCES

1. Goadsby PJ, Holland PR, Martins-Oliveira M, Hoffmann J, Schankin C, Akerman S. Pathophysiology of migraine: A disorder of sensory processing. *Physiol Rev.* 2017;97(2):553–622.
2. Kaviraj Ambikadatta Shastri, editor. *Sushruta Samhita Ayurveda Tattva Sandipika*. Varanasi: Chaukhamba Sanskrit Sansthan; 2016. Sharir Sthana 5/63, p. 66.
3. Sharma H, Chandola HM, Singh G, Basisht G. Utilization of Ayurveda in health care: An approach for prevention, health promotion, and treatment of disease. *Ayu.* 2015;36(2):93–8.
4. Rastogi S. Ayurvedic approach to migraine: Conceptual and management review. *Ayu.* 2018;39(4):203–9.
5. Tripathi RD, editor. *Charaka Samhita Vaidyamanorama Hindi Commentary*. Delhi: Chaukhambha Sanskrit Pratishthan; 2011. Sutra Sthana 11/54, p. 89.
6. Murthy KRS, editor. *Ashtanga Hridaya of Vagbhata*. Varanasi: Chaukhambha Krishnadas Academy; 2018. Sutra Sthana 12/9, p. 193.
7. Dalhana Tika on *Sushruta Samhita*, Nidana Sthana 1/33. Varanasi: Chaukhambha Sanskrit Sansthan; 2016. p. 272.
8. Charles A. The pathophysiology of migraine: Implications for clinical management. *Lancet Neurol.* 2018;17(2):174–82.
9. Edvinsson L. The trigeminovascular pathway: Role of CGRP and CGRP receptors in migraine. *Headache.* 2017;57(S2):47–55.
10. Zhang X, Levy D, Kainz V, Nosedá R, Jakubowski M, Burstein R. Activation of meningeal nociceptors by cortical spreading depression: Implications for migraine with aura. *J Neurosci.* 2010;30(26):8807–14.
11. Buse DC, Greisman JD, Baigi K, Lipton RB. Migraine progression: A systematic review. *Headache.* 2019;59(3):306–38.

12. Yuan H, Lauritsen CG, Kaiser EA, Silberstein SD. Recent advances in migraine therapy. *Curr Opin Neurol*. 2019;32(3):346–53.
13. Liu D, Lian Y, Li X, et al. Experimental evidence of neuroprotective and anti-inflammatory actions of herbal formulations in migraine models. *Front Pharmacol*. 2022;12:835187.
14. Sharma R, Singh RH. Clinical evaluation of *Nasya Karma* and *Shirodhara* in the management of *Ardhavabhedaka* (migraine). *Ayu*. 2017;38(1–2):53–9.
15. Lian Y, Li X, Wen W, Wu S. Mechanistic insights into herbal modulation of CGRP and TRPV1 pathways in migraine. *J Physiol Investig*. 2025;68(3):201–9.