

Review Article



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"NASYA KARMA IN NEUROLOGICAL AND PSYCHIATRIC CONDITIONS: A REVIEW OF THE NOSE-TO-BRAIN PATHWAY"

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ABSTRACT:

Background: Nasya, the administration of medicated oils, ghee, powders or juices through the nose, is one of the five main purification procedures (Panchakarma) of Ayurveda. Classical texts describe the nose as the gateway to the head (Nasa hi shiraso dvaram) and recommend Nasya for disorders above the clavicle, including mental and neurological conditions. Modern pharmaceutical science has established that some substances administered intranasally can reach the brain directly through olfactory and trigeminal pathways, bypassing the blood-brain barrier. **Objective:** To review the classical concept and practice of Nasya, the modern evidence for nose-to-brain transport, and the clinical evidence relevant to Nasya in neurological and psychiatric conditions. **Methods:** Narrative review of classical Ayurvedic texts and of pharmaceutical, neuroscience and clinical literature on intranasal delivery to the central nervous system. **Results:** Classical texts describe several types of Nasya (Virechana, Brimhana, Shamana, Marsha and Pratimarsha) with indications including headache, insomnia, anxiety, Unmada, Apasmara and memory loss. Modern studies show that intranasal administration can deliver peptides, small molecules and biologics to the brain via olfactory and trigeminal nerve pathways, and intranasal medicines are now approved for treatment-resistant depression and seizure clusters. Intranasal insulin has been tested in Alzheimer's disease. Clinical evidence for Ayurvedic Nasya in mental and neurological disorders is limited to small studies and case series. **Conclusion:** The classical idea that the nose is a gateway to the head is supported by modern evidence for nose-to-brain delivery. Whether Ayurvedic Nasya formulations exploit this pathway has not yet been tested. Pharmacokinetic studies and controlled clinical trials are needed.

Keywords: Nasya; Panchakarma; nose-to-brain delivery; intranasal; olfactory pathway; Anu Taila; anxiety; neurological disorders

INTRODUCTION:

The blood–brain barrier protects the brain but also blocks most medicines from reaching it. Pharmaceutical scientists have therefore searched for routes that can bypass this barrier. One of the most promising is the intranasal route, which offers direct anatomical connections between the nasal cavity and the brain through the olfactory and trigeminal nerves^[1–3].

Ayurveda recognised the special relationship between the nose and the head long ago. Charaka and Vagbhata state that the nose is the gateway to the head, and that medicines administered through the nose reach the head and remove disorders there^[4,5]. Nasya is accordingly the preferred route for treating diseases above the clavicles (Urdhvajatrugata Roga), which include many neurological and mental conditions.

This review examines the classical concept and practice of Nasya, summarises modern evidence on nose-to-brain delivery, and considers the clinical evidence and research needs for Nasya in neurological and psychiatric conditions.

METHODS:

Classical sources included Ashtanga Hridaya (Sutra Sthana 20),

Charaka Samhita (Siddhi Sthana 9) and Sushruta Samhita (Chikitsa Sthana 40)^[4–6]. Modern literature was identified through PubMed and Google Scholar using intranasal delivery, nose-to-brain, olfactory pathway, trigeminal pathway, intranasal insulin, esketamine, midazolam nasal and Nasya. This is a narrative review.

CLASSICAL CONCEPT AND PRACTICE OF NASYA:

Definition and importance

Nasya is defined as the administration of medicine through the nose. It is one of the five Panchakarma procedures and is described as the most important treatment for diseases of the head^[4]. The statement that the nose is the gateway to the head (Nasa hi shiraso dvaram) appears in classical texts and expresses the belief that medicines given through the nose spread through the channels of the head, senses and mind^[4,5].

Types of Nasya

Classical texts classify Nasya in several ways. Vagbhata describes three main types by action^[4]:

Table 1: Types of Nasya by action

Type	Action	Typical indications
Virechana Nasya	Eliminating, using pungent substances	Kapha disorders of the head; heaviness, sinus congestion, some mental disorders with Kapha and Tamas
Brimhana Nasya	Nourishing, using oils and ghee	Vata disorders; headache, insomnia, nervous weakness, degenerative conditions
Shamana Nasya	Pacifying	Pitta and other disorders; burning sensations, bleeding

By dose, Nasya is also divided into Marsha Nasya (larger dose, given in a clinical setting) and Pratimarsha Nasya (small dose, about two drops in each nostril, suitable for daily use at home)^[4]. Pratimarsha Nasya is recommended as part of the daily routine (Dinacharya) to maintain the health of the senses and mind.

Common Nasya preparations

- Anu Taila: a sesame oil-based formulation used for daily Pratimarsha Nasya and in many head and neck conditions.
- Ksheerabala Taila: a milk and Bala-based oil used for Vata disorders, including neurological and anxiety conditions.
- Brahmi Ghrita and other Medhya Ghritas: used in mental disorders, memory problems and epilepsy.
- Vacha and other pungent powders (Pradhamana Nasya): used to clear the head and restore consciousness, for example in Apasmara and Unmada.
- Shadbindu Taila: used for headache and other head disorders.

Procedure

The patient's face and neck are massaged and fomented. The head is tilted back, and the prescribed dose is instilled into each nostril. The patient inhales gently, the soles, palms and shoulders may be massaged, and expectorated material is spat out. The patient rests and avoids cold exposure afterwards^[4]. Contraindications include acute fever, indigestion, immediately after meals or bathing, pregnancy and certain other states.

Indications in mental and neurological conditions

Classical texts recommend Nasya for headache, facial palsy,

insomnia, loss of memory, Unmada, Apasmara, Ardita and disorders of the senses^[4–6]. In current practice, it is widely used for anxiety, insomnia, migraine, cognitive decline and as an adjunct in depression and epilepsy.

Classical explanation of the mode of action

Classical commentators explain that medicine administered through the nose reaches Shringataka, a vital meeting point (Marma) of channels supplying the nose, eyes, ears and tongue located within the head. From there it spreads through the channels of the head and senses, dislodges morbid Doshas and removes them^[4]. This explanation describes a junction of sensory pathways inside the skull, reached through the nose, which is broadly compatible with modern descriptions of the olfactory and trigeminal routes to the brain.

The texts also emphasise preparatory massage and fomentation of the face and neck before Nasya, which may increase local blood flow and soften secretions, and post-procedure massage and gargling to clear residual material^[4]. These steps could influence absorption and clearance and should be standardised in research.

Nasya in specific conditions

Anxiety and insomnia. Brimhana Nasya with Ksheerabala Taila, Anu Taila or Medhya Ghrita is used to pacify Vata, calm the mind and promote sleep. Pratimarsha Nasya is often continued at home for several weeks after a clinical course.

Depression. In Kaphaja presentations with heaviness and

inertia, mild Virechana Nasya with pungent herbs may be used to “clear” the head, followed by nourishing Nasya. In Vataja presentations, nourishing oils are preferred.

Cognitive decline. Medhya Ghrita Nasya is used traditionally for memory loss in older adults, consistent with Ayurveda’s view of Nasya as nourishing the senses and mind.

Epilepsy and psychosis. Pradhamana Nasya (blowing of fine powders) with Vacha or other pungent substances is described for restoring consciousness during attacks, and nourishing Nasya with medicated ghee for long-term management. Any use in these conditions must be coordinated with standard medical treatment.

Headache and migraine. Nasya with Shadbindu Taila or Anu Taila is among the most common Ayurvedic treatments for headache, an indication that falls within the classical category of Urdhvajatrugata Roga.

MODERN EVIDENCE FOR NOSE-TO-BRAIN DELIVERY:

Anatomical pathways

The upper part of the nasal cavity contains the olfactory epithelium, whose sensory neurons project directly through the cribriform plate to the olfactory bulb. The respiratory epithelium is supplied by branches of the trigeminal nerve, which enters the brainstem. Substances applied to the nasal mucosa can travel along these nerves, either inside nerve cells (intracellular transport) or through spaces around the nerves (extracellular or perineural transport), and reach the brain and cerebrospinal fluid without passing through the blood–brain barrier^[1–3].

Factors affecting delivery

The amount of drug that reaches the brain depends on its molecular size, lipophilicity, charge and solubility, the formulation, the site of deposition in the nose, and the time the formulation remains in contact with the mucosa^[1,7]. Mucociliary clearance removes material from the nasal cavity within minutes, so formulations that adhere to the mucosa (mucoadhesive systems) increase residence time and absorption^[7]. Deposition in the upper nasal cavity near the olfactory region favours brain delivery.

These factors are relevant to Ayurvedic Nasya. Oil and ghee formulations are viscous and lipophilic and may remain on the mucosa longer than aqueous drops. The classical procedure of tilting the head back and inhaling gently may favour deposition in the upper nasal cavity. These hypotheses have not been tested experimentally.

Human evidence for nose-to-brain delivery

In a key human study, intranasal administration of neuropeptides (melanocortin, vasopressin and insulin) increased their

concentrations in the cerebrospinal fluid within minutes, without corresponding increases in blood, providing direct evidence of nose-to-brain transport in humans^[8].

Intranasal therapies in neurology and psychiatry

Intranasal delivery is now used in clinical medicine for brain disorders:

- Depression: esketamine nasal spray, combined with an oral antidepressant, improved depressive symptoms in patients with treatment-resistant depression compared with an oral antidepressant plus placebo spray^[9], and it has regulatory approval in several countries.
- Epilepsy: midazolam nasal spray reduced the recurrence of seizures in patients with seizure clusters compared with placebo^[10].
- Alzheimer’s disease: in a pilot randomised trial, intranasal insulin improved delayed memory and preserved general cognition in adults with amnesic mild cognitive impairment or mild to moderate Alzheimer’s disease^[11].

These examples demonstrate that the nasal route can deliver clinically meaningful doses of medicines to the brain.

The olfactory system, emotion and memory

The olfactory system has unique direct connections to brain regions involved in emotion and memory, including the amygdala, hippocampus and orbitofrontal cortex^[12,13]. Smells can rapidly influence mood and evoke memories. Olfactory impairment is an early feature of Alzheimer’s disease and other neurodegenerative conditions^[14]. These connections may explain why aromatic substances used in Nasya, such as Vacha and other pungent herbs, are traditionally used to “awaken” the mind and restore consciousness.

CLINICAL EVIDENCE FOR AYURVEDIC NASYA IN MENTAL AND NEUROLOGICAL CONDITIONS:

Clinical evidence is limited. Case series and small studies describe the use of Pratimarsha Nasya with Medhya Ghrita in generalised anxiety disorder^[15], and of various Nasya preparations in insomnia, migraine, cognitive impairment and depression. These reports generally describe improvement, but they do not have control groups, blinding or standardised outcome measures, and they cannot distinguish the effects of Nasya from those of concurrent oral medicines, other procedures, or natural recovery.

No published study has measured whether constituents of Ayurvedic Nasya formulations reach the brain in humans or animals. This is a critical gap. Without such evidence, the nose-to-brain explanation for Nasya, though plausible, remains a hypothesis.

Table 2: Evidence for intranasal approaches and Ayurvedic Nasya by clinical area

Area	Evidence for intranasal approach (modern)	Evidence for Ayurvedic Nasya
Nose-to-brain transport	Demonstrated for peptides and small molecules ^[1–3,8]	Not studied
Depression	Approved intranasal esketamine ^[9]	Case reports and small studies
Epilepsy (seizure clusters)	Approved intranasal midazolam ^[10]	Classical use; no trials

Area	Evidence for intranasal approach (modern)	Evidence for Ayurvedic Nasya
Cognitive impairment	Pilot RCT of intranasal insulin ^[11]	Classical use; no trials
Anxiety	—	Case series ^[15]
Insomnia	—	Small uncontrolled studies

RESEARCH PRIORITIES:

Several lines of research could test the classical claims for Nasya:

1. Deposition studies: imaging studies using labelled oils to determine where Nasya formulations deposit in the nasal cavity and how long they remain.
2. Pharmacokinetic studies in animals: measuring marker constituents of Nasya formulations in the olfactory bulb, brain tissue and cerebrospinal fluid after intranasal administration, compared with oral administration.
3. Formulation science: characterising the physicochemical properties of classical Nasya oils (viscosity, droplet size, lipophilicity, mucoadhesion) and comparing them with modern intranasal formulations.
4. Clinical trials: randomised trials of Pratimarsha Nasya with standardised oils or Medhya Ghrita in anxiety, insomnia and mild cognitive impairment, using sham Nasya with plain sesame oil as a control and standard outcome measures.
5. Safety studies: assessing the effects of long-term daily Nasya on the nasal mucosa and ciliary function, and the risk of lipid pneumonia from aspiration of oils, particularly in older adults and children.

SAFETY CONSIDERATIONS:

Nasya is generally safe when properly performed, but adverse effects can occur. These include sneezing, nasal irritation, headache, heaviness, and throat irritation. Aspiration of oil into the lungs can cause lipid pneumonia, especially in people with impaired swallowing or consciousness, and in young children; this risk should be considered when Nasya is given to elderly patients, those with neurological impairment and infants. Pungent Virechana Nasya can cause significant irritation and should be used carefully. Formulations should be prepared hygienically to avoid contamination. Patients with nasal or sinus infections, recent nasal surgery or nosebleeds need assessment before Nasya.

DISCUSSION:

The Ayurvedic statement that the nose is the gateway to the head anticipated a principle that modern pharmaceutical science has confirmed: the nasal cavity provides a direct route to the brain. Intranasal medicines are now used for depression and seizure emergencies and are being studied in dementia. This convergence gives Nasya a strong conceptual foundation. However, conceptual plausibility is not evidence of efficacy. Modern intranasal medicines are carefully formulated for nasal delivery, delivered with devices that control dose and deposition, and tested in rigorous trials. Ayurvedic Nasya formulations are traditional oils and ghees whose constituents, deposition and brain delivery have not been characterised. Clinical studies of Nasya in mental and neurological disorders are few, small and uncontrolled.

Ayurveda is well placed to contribute to nose-to-brain research.

Its long experience with intranasal oils and ghees, its classification of Nasya by action and dose, and its range of formulations offer many candidates for study. Collaboration between Ayurveda researchers, pharmaceutical scientists and neurologists could move Nasya from tradition to evidence.

CONCLUSION:

Nasya is a classical Ayurvedic procedure based on the principle that the nose is the gateway to the head. Modern research confirms that intranasal administration can deliver drugs to the brain and has produced approved treatments for depression and seizure clusters. The specific effects of Ayurvedic Nasya formulations on the brain and on mental and neurological disorders have not been established. Deposition, pharmacokinetic and controlled clinical studies are needed to test this ancient and promising route.

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