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BRAHMI GHRITHA PRATIMARSHA NASYA FOR MEMORY: A REVIEW ARTICLE

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ABSTRACT

Memory is the recalling of past information and retaining that information in learners. Memory impairment is a common concern among individuals of all ages, with implications for daily functioning and quality of life. The physiological actions of memory are regulated mainly by neurotransmitters and synaptic neurotransmission, among other factors involved. The involvement of neurotransmitters is evident in various diseases involving impairment of memory.

Among the various components that impair the neurotransmitters, the involvement of the nasal microbiome is also one of them. Studies have found several commonly "health-associated" sinonasal bacterial taxa to be positively associated with higher neurotransmitter concentrations and negatively associated with depression severity. In dementia-related diseases, the influence of the nasal microbiome is also noted.

Hence, an ideal treatment targeting memory would be *nasya*. *Pratimarsha nasya* is mentioned as a procedure in *dinacharya*. *Pratimarsha nasya* has a preventive component for many diseases. This fact enables us to hypothesize that it may influence the nasal microbiome and hence maintain the neurotransmitters, thus acting on memory. *Brahmi Gritha Pratimarsha Nasya*, an *Ayurvedic* nasal medication containing Bacopa monnieri (*Brahmi*), has been traditionally used to enhance cognitive function and memory. This systematic review aims to evaluate the efficacy

of *Brahmi Gritha Pratimarsha Nasya* in memory enhancement. The data in our study also shows the influence of *pratimarsha nasya* on memory.

Keywords: *Brahmi, nasya*, memory, nasal administration.

INTRODUCTION

In an era of continually escalating cognitive demands, the quest for effective strategies to enhance memory and cognitive function has become paramount. Among the myriad of traditional remedies in *Ayurveda*, *Brahmi Ghritha* stands out as a potential formulation for addressing cognitive concerns. Derived from ancient Indian medicinal practices, *Nasya* involves the administration of medicated lipids through the nasal route.

Memory is a multifaceted cognitive process integral to daily functioning and quality of life. Cognitive decline associated with ageing, stress and various neurological conditions underscores the urgent need for interventions capable of preserving and augmenting cognitive capabilities. *Brahmi Gritha*, with its purported neuroprotective and memory-enhancing properties, emerges as a promising avenue for exploration. *Pratimarsha Nasya*, a pivotal component of *dinacharya*, is aimed at prevention and has curative benefits in certain conditions.

In an era marked by a burgeoning interest in integrative and holistic approaches to healthcare, traditional remedies like *Brahmi Gritha Nasya* hold immense promise. This review aims to explore newer interventions for memory enhancement.

By synthesising empirical evidence and unravelling underlying mechanisms, this endeavour strives to illuminate *Brahmi Gritha Nasya's* potential as an asset in the pursuit of cognitive well-being and vitality.

MATERIALS AND METHODS:

With objectives to study the concept of memory according to *Ayurveda* and modern science and to analyse the idea of *Brahmi Ghrita Nasya* as a memory enhancer, various *Ayurveda* classical literature and research articles were referred to, and relevant information was compiled and analysed.

Memory

Exploring memory enhancement entails a comprehensive examination deeply rooted in *Ayurvedic* principles. Across ancient *Ayurvedic* texts, the term "*Buddhi*" emerges in various contexts, symbolizing not only logical reasoning but also representing an elevated state or process leading to genuine wisdom. Similarly, "*Medha*" holds significance in its ability to grasp and retain information, reflecting the core essence of cognitive function. Analogous concepts such as *Dhi*, *Dhriti*, and *Smriti* further enrich our comprehension of memory faculties. Significantly, the quest for enhancing cognitive abilities, encompassing intelligence and memory, predates modern pharmacology by millennia. *Brahmi*, prominently featured in classical texts, serves as a revered remedy, underscoring a profound understanding of cognitive enhancement rooted in ancient wisdom. Memory is defined as the faculty of encoding, storing and retrieving information. Molecular neurobiology defines memory as a neurochemical process that includes conditioning and any form of stored experience. Several neurotransmitters like acetylcholine (Ach), glutamate, γ-amino-butyric acid (GABA) and catecholamines have shown evidence that variations are correlated with changes in memory formation. Its derivation is from “memoria” meaning “mindful.”

Brahmi

Bacopa monnieri is distinguished by its characteristic chemical profile, primarily comprised of constituents such as dammarane-type triterpenoid saponins, notably referred to as bacosides, featuring aglycone units of jujubogenin or pseudo-jujubogenin. Bacosides stand out as pivotal components renowned for their capacity to augment nerve impulse conduction. These bioactive compounds play a crucial role in facilitating the rejuvenation of impaired neurons through the enhancement of neuronal synthesis and kinase activity.

Additionally, bacosides reinstate synaptic functionality, enabling efficient nerve impulse propagation.[1] *Brahmi* exhibits neuroprotective properties in rats by preserving the levels of mitochondrial enzymes, which were disrupted as a result of morphine induction.[2] A constituent found in *Brahmi*, known as BN52021, functions as a platelet-activating factor receptor antagonist. When administered to mice to induce retrograde amnesia, *Brahmi* treatment was observed to mitigate this effect. This could be attributed to increased brain glutamate levels and increasing platelet-activating factor synthesis.[3]

Ghrita

Ghee, known as *Ghritha*, has neuroprotective properties that help shield neurons from oxidative stress and inflammation, preserving cognitive abilities such as memory retention. With their bioavailability and absorbent qualities, memory-enhancing herbs further bolster their efficacy in supporting mental health. Moreover, *ghritha's* calming effect on the mind and nervous system promotes relaxation, reducing stress and anxiety, which are known to impair memory function. According to *Ayurveda* principles, ghee is believed to nourish ojas, the subtle essence of all bodily tissues, including the brain. A well-nourished brain is thought to function optimally, leading to improved memory and cognitive abilities. Ghee, when aged for more than a year, particularly excels in promoting mental healing.

Regarding the distribution of drugs in the bloodstream, lipid solubility plays a predominant role along with factors such as ionization and regional blood flow variances. Water-soluble drugs tend to be primarily distributed in extracellular spaces and may not easily penetrate into cerebrospinal fluid (CSF) and other body cavities. Conversely, lipid-soluble drugs exhibit rapid distribution throughout both intra and extracellular spaces. Drugs administered with *Ghrita* (ghee) and formulated in ghee form are swiftly absorbed and dispersed, allowing them to reach distant areas of the body, including the central nervous system (CNS).In this context, the targeted regions of the body include the nervous system, primarily due to the molecular structure of the blood-brain barrier. This barrier, which separates CNS tissue from circulating blood, is inherently lipophilic, thereby selectively permitting the passage of lipids and lipid-soluble drugs. Hence, any drug administered in ghee form is facilitated in crossing this barrier.[4]

Intranasal drug delivery

The intranasal route of drug delivery offers the distinct advantage of targeted delivery to the brain within a short anatomical distance. This administration route holds promise due to its non-invasive nature, utilizing the olfactory nerve system to efficiently transport drugs directly to the brain.[5] Delivery of drugs via the olfactory region offers a direct pathway to the brain, bypassing systemic circulation, owing to the physiological connection of olfactory neurons from the nasal mucosa to the brain. This route predominantly utilises the olfactory nerve as an intraneuronal pathway or the olfactory epithelial cells surrounding the nerve pathway. Furthermore, drug transport through olfactory epithelial cells can occur via transcellular methods such as endocytosis and simple diffusion, as well as paracellular methods through intercellular junctions.[6] The respiratory region, occupying a significant portion of the nasal cavity, features a dense network of capillaries facilitating efficient absorption of drugs into the bloodstream. Consequently, drug administration to this region results in systemic circulation, offering an indirect pathway for drug delivery to the brain through the blood-brain barrier (BBB).[7] The emerging body of evidence suggests that nasal medications hold significant promise as a novel approach for enhancing memory function. By exploiting the unique anatomical connection between the nasal cavity and the central nervous system, these medications offer a direct route for drug delivery to the brain, bypassing the blood-brain barrier. The efficacy of nasal medications in improving memory function underscores their promise as a valuable tool in the quest to optimize cognitive health and quality of life.

Pratimarsha Nasya

The clinical relevance of *Pratimarsha Nasya* in memory enhancement lies in its potential to offer a holistic and non-invasive approach to supporting cognitive health. With memory deficits being a common

concern in various neurological conditions, including Alzheimer's disease and age-related mental decline, interventions that can effectively enhance memory function are highly sought after. Pratimarsha Nasya, by delivering therapeutic compounds directly to the brain through the nasal route, bypassing the blood-brain barrier, offers a promising avenue for addressing memory-related concerns. Its traditional use in *Ayurveda*, coupled with emerging scientific evidence supporting its efficacy, underscores its potential clinical significance. *Nasya*, a pivotal component, has been shown to positively influence memory and cognitive functions in individuals of sound health, thereby highlighting the importance of adhering to the prescribed daily regimens outlined by our revered *Acharyas* for promoting longevity and overall well-being. Hence, incorporating *Pratimarsha Nasya* into integrative treatment approaches may provide patients with a safe and accessible option for improving memory function and overall cognitive well-being, thus enhancing their quality of life.[8]

DISCUSSION & CONCLUSION

Brahmi, which has proven to be a memory enhancer, would be beneficial if administered in ghrita form as it is easy to absorb. An increase in *vata* is related to a reduction in the memory component. Hence, a *Sneha* is better to improve memory. This *Brahmi ghrita* in the oral route would have palatability issues and is also required in more quantity than *nasya*. Also, in *nasya* form, it can be hypothesised to influence the *nasal* microbiome, which further influences neurotransmitters and thus influences memory. Among the different types of *nasya*, *pratimarsha nasya* is explained as a *dinacharya*; hence, it can be hypothesised that *Brahmi Ghrita Pratimarsha nasya* might help healthy individuals in enhancing memory and also might have a neuroprotective effect in the long run thus, preventing memory-related disorders. Also, as *nasya*, the medicament is absorbed faster and is devoid of palatability issues, which would be suitable for all age groups.

Thus, the article proposes that *pratimarsha nasya* with *Brahmi Ghrita* would be an ideal memory enhancer for the student population and might act as *rasayana* for older people.

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