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Review Article

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"SMRITIBHRAMSHA AND NEURODEGENERATIVE DEMENTIA: A REVIEW OF RASAYANA INTERVENTIONS IN ALZHEIMER'S DISEASE"

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ABSTRACT:

Background: Dementia affects over 55 million people worldwide, with Alzheimer's disease the most common cause. India has an estimated 8.8 million older adults living with dementia. Disease-modifying treatments remain limited, and prevention through modifiable risk factors is increasingly emphasised. Ayurveda describes loss of memory (Smritibhramsha or Smritinasha) and its relation to ageing, and offers Medhya Rasayana and other rejuvenative therapies for preserving intellect and memory. **Objective:** To review the Ayurvedic understanding of memory and its decline, and the experimental and clinical evidence for Rasayana interventions relevant to Alzheimer's disease and cognitive ageing. **Methods:** Narrative review of classical texts and of preclinical and clinical studies identified through PubMed and Google Scholar, with emphasis on randomised controlled trials and meta-analyses. **Results:** Ayurveda attributes decline of memory to ageing (Vriddhavastha) with Vata predominance, depletion of Dhatus and Ojas, and mental factors, and prescribes Medhya Rasayanas such as Mandukaparni, Yashtimadhu, Guduchi and Shankhapushpi. In healthy adults, a meta-analysis of randomised trials found that Bacopa improved attention and some cognitive measures. Ashwagandha improved memory and executive function in a small trial in mild cognitive impairment and reversed amyloid pathology in an Alzheimer's mouse model. A bioavailable curcumin improved memory and reduced brain amyloid and tau signals in non-demented adults over 18 months. No Rasayana has been shown to slow progression of established Alzheimer's dementia. **Conclusion:** Rasayana herbs show promise for cognitive ageing and mild cognitive impairment, consistent with Ayurveda's preventive emphasis. Rigorous long-term trials with clinical and biomarker outcomes are needed in people at risk of, or in early stages of, Alzheimer's disease.

Keywords: Smritibhramsha; dementia; Alzheimer's disease; Medhya Rasayana; Bacopa; Ashwagandha; curcumin; cognitive ageing

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INTRODUCTION:

Dementia is a syndrome of progressive decline in memory, thinking and daily functioning. The World Health Organization estimates that more than 55 million people live with dementia worldwide[1]. Alzheimer's disease, characterised pathologically by amyloid plaques and tau tangles, accounts for most cases[2]. In India, a nationally representative study estimated dementia prevalence of 7.4% among adults aged 60 and over, corresponding to about 8.8 million people[3].

Treatment options are limited. Cholinesterase inhibitors and memantine provide modest symptomatic benefit. Anti-amyloid antibodies such as lecanemab slow clinical decline modestly in early Alzheimer's disease, but they are expensive, require specialised monitoring and carry risks of brain swelling and bleeding[4]. In this context, prevention has become a major focus. The 2024 Lancet Commission on dementia identified 14 modifiable risk factors, including low education, hearing loss, hypertension, physical inactivity, diabetes, depression and social isolation, which together may account for nearly half of dementia cases worldwide[5].

Ayurveda is fundamentally preventive and gives special attention to the preservation of memory and intellect. Medhya Rasayana, a category of rejuvenative therapy aimed at the mind, has been used for centuries. This review describes the Ayurvedic understanding of memory and its decline and evaluates the evidence for Rasayana interventions relevant to Alzheimer's disease.

METHODS:

Classical sources included Charaka Samhita (Sharira Sthana 1 and Chikitsa Sthana 1), Sushruta Samhita (Sutra Sthana 35) and Sharangadhara Samhita (Purva Khanda 6)[6–8]. Literature was searched in PubMed and Google Scholar using dementia, Alzheimer's disease, mild cognitive impairment, cognitive ageing, memory, Rasayana, Medhya, Bacopa, Brahmi, Ashwagandha, Withania, Centella, Mandukaparni, Shankhapushpi, Guduchi and curcumin. Priority was given to randomised controlled trials and meta-analyses; key preclinical studies were included where they illustrate mechanisms.

MEMORY AND ITS DECLINE IN AYURVEDA:

The concept of Smriti

Ayurveda distinguishes Dhi (the ability to understand), Dhriti (the ability to retain and restrain) and Smriti (the ability to recall). Charaka lists eight causes of good memory: knowledge of causes, knowledge of form, similarity, contrast, attention to context, practice, acquiring knowledge and repeated hearing[6]. This analysis of memory processes, including associative and contextual recall and the role of repetition, is strikingly modern.

Smritibhramsha and Smritinasha

Loss of memory appears in classical texts in several contexts: as a component of Prajnaparadha (Smriti Vibhramsha), as a feature of Unmada and Apasmara, and as a feature of ageing[6]. There is no separate classical chapter on dementia, but the progressive loss of memory and intellect in old age is clearly recognised.

Ageing and the decline of faculties

Sushruta describes old age as a period when Dhatus, strength, sense organs and enthusiasm decline and Vata predominates[7]. Sharangadhara gives a decade-by-decade account of the faculties lost with age, including Medha (intellect) and Buddhi (understanding) in later decades[8]. This model of age-related decline anticipates modern descriptions of cognitive ageing.

Pathogenesis

In Ayurvedic terms, the progressive decline of memory in old age can be understood as follows. Vata, which is dry, light and mobile, predominates and dries the tissues. The nourishing essence of the tissues (Ojas) and the nutrition of Majja Dhatu (marrow and nerve tissue) decline. Tarpaka Kapha, which nourishes the brain and senses, is depleted. Sadhaka Pitta, responsible for intellect and comprehension, is weakened. The Manovaha Srotas are obstructed by Ama or depleted. Mental factors such as grief, loneliness and lack of stimulation further impair the mind.

Table 1: Ayurvedic factors in cognitive decline and their hypothesised modern parallels.

Ayurvedic factor	Modern parallel (hypothesis)
Vata predominance in old age	Neuronal loss, synaptic dysfunction, reduced brain reserve
Depletion of Ojas and Majja Dhatu	Loss of neuronal and synaptic integrity; reduced neurotrophic support
Ama obstructing channels	Accumulation of amyloid and tau; impaired clearance
Weak Agni and Dhatvagni	Metabolic dysfunction, insulin resistance, mitochondrial impairment
Mental factors (grief, isolation)	Depression and social isolation as dementia risk factors

Rasayana and Medhya Rasayana

Charaka defines Rasayana as the means of obtaining the best qualities of Rasa and other Dhatus, leading to long life, memory, intelligence, health, youth, complexion and strength[6]. He names four plants as specific Medhya Rasayanas: the juice of Mandukaparni, powder of Yashtimadhu with milk, juice of Guduchi with its root and flower, and paste of Shankhapushpi[6]. Brahmi, Ashwagandha, Vacha, Jyotishmati and Amalaki are also widely used. Classical compound formulations include Brahmi Ghrita, Saraswata Churna, Saraswatarishta and Medhya Rasayana preparations based on the four classical herbs.

Rasayana is typically preceded by purification of the body and is most effective when combined with appropriate diet, conduct (Achara Rasayana) and mental discipline.

EVIDENCE FOR INDIVIDUAL RASAYANA HERBS:

Brahmi (Bacopa monnieri)

Bacopa is the most studied Medhya herb. A meta-analysis of nine randomised controlled trials including 518 participants found that Bacopa extract improved performance on the Trail Making Test part B and reduced choice reaction time, suggesting benefits for attention and speed of processing[9]. A 90-day randomised controlled trial in healthy adults found improvements in spatial working memory accuracy and in a measure of memory consolidation[10]. Most trials were in healthy adults or older adults without dementia, and effect sizes were modest. No adequately powered trial has shown that Bacopa slows Alzheimer's disease.

Ashwagandha (Withania somnifera)

In a randomised, double-blind, placebo-controlled trial in 50 adults with mild cognitive impairment, Ashwagandha root extract 300 mg twice daily for eight weeks improved immediate and general memory, executive function, sustained attention and information-processing speed compared with placebo[11]. In a mouse model of Alzheimer's disease, Withania somnifera extract reversed behavioural deficits and reduced brain amyloid plaques, apparently by increasing liver production of a protein (LRP) that clears amyloid from the brain into the blood[12]. This finding connects the brain and liver in a way that resonates with Ayurveda's systemic view of disease.

Mandukaparni (Centella asiatica)

In a randomised, placebo-controlled trial in healthy elderly volunteers, Centella asiatica extract improved working memory and mood measures over two months[13]. Preclinical studies suggest antioxidant and neuroprotective effects. Clinical trials in dementia are lacking.

Haridra (curcumin)

Turmeric is widely used in Ayurveda, though not usually classed as a Medhya herb. In an 18-month randomised, double-blind, placebo-controlled trial in 40 non-demented adults aged 51 to 84, a bioavailable form of curcumin improved memory and attention compared with placebo[14]. Brain imaging with a radiotracer that binds amyloid and tau showed reduced signals in the amygdala and hypothalamus in the curcumin group. The trial was small, but it is one of the few long-term Rasayana-related studies with brain biomarker outcomes.

Guduchi, Shankhapushpi and Yashtimadhu

These classical Medhya Rasayanas have shown memory-enhancing, antioxidant and neuroprotective effects in animal studies, but well-designed human trials in cognitive impairment are not yet available.

Table 2: Summary of evidence

Rasayana	Population studied	Main finding	Certainty (authors' judgement)
Bacopa	Healthy adults and older adults; meta-analysis[9,10]	Improved attention, processing speed, some memory measures	Moderate (for healthy adults)
Ashwagandha	Mild cognitive impairment, RCT[11]; AD mouse model[12]	Improved memory and executive function; reduced amyloid in mice	Low
Mandukaparni	Healthy elderly, RCT[13]	Improved working memory and mood	Low
Curcumin	Non-demented adults, 18 month RCT[14]	Improved memory; reduced amyloid and tau signals	Low
Guduchi, Shankhapushpi,	Animal studies	Neuroprotective effects	Very low (clinical)

Rasayana and dementia prevention

The strongest case for Rasayana may lie in prevention rather than treatment. The Lancet Commission's list of modifiable risk factors includes physical inactivity, depression, social isolation, hypertension, diabetes, obesity, excessive alcohol and poor sleep[5]. Ayurvedic lifestyle principles address many of these directly: Dinacharya promotes regular exercise and sleep; Sadvritta and Achara Rasayana encourage social engagement and avoidance of excess; dietary rules support metabolic health; and Sattvavajaya addresses grief and low mood. The use of Medhya herbs is embedded within this broader lifestyle framework.

This combination of lifestyle and supplementation resembles multidomain intervention trials in modern dementia prevention, which combine diet, exercise, cognitive training and vascular risk management; in the FINGER trial, a two-year multidomain intervention improved or maintained cognitive functioning in at-risk older adults compared with general health advice[15]. An Ayurvedic multidomain programme, combining Dinacharya, diet, yoga, social engagement and a standardised Medhya Rasayana, could be tested in older adults at risk of dementia.

Possible mechanisms of Rasayana in neurodegeneration

Several mechanisms may explain how Rasayana herbs could support cognition. They are presented here as hypotheses for research rather than established facts in humans.

Antioxidant and anti-inflammatory action. Oxidative stress and chronic neuroinflammation contribute to neuronal damage in Alzheimer's disease[2]. Bacopa, Centella, Ashwagandha and curcumin have antioxidant and anti-inflammatory properties in experimental studies. In Ayurvedic terms, these effects may correspond to the clearing of Ama and the protection of Ojas.

Clearance of amyloid and tau. The Withania study in mice suggested a peripheral route of amyloid clearance through the

liver [12], and the curcumin trial reported reduced amyloid and tau signals in brain regions involved in memory and emotion[14]. These findings are preliminary but point to mechanisms relevant to Alzheimer's pathology.

Cholinergic and synaptic support. Memory depends heavily on cholinergic signalling and synaptic plasticity. Several Medhya herbs have been reported in preclinical work to influence acetylcholinesterase activity and synaptic proteins, which may underlie improvements in attention and memory seen in trials of Bacopa and Ashwagandha[9,11].

Stress reduction and sleep. Chronic stress and poor sleep are linked to cognitive decline. Ashwagandha reduces stress and improves sleep in trials reviewed elsewhere, and yoga-based practices improve sleep quality. By improving these factors, Rasayana and lifestyle measures could indirectly protect cognition.

Metabolic health. Diabetes, hypertension and obesity are dementia risk factors [5]. Ayurvedic dietary regulation and some Rasayana herbs may improve metabolic parameters, which could reduce vascular contributions to cognitive impairment.

Ayurvedic care for people living with dementia

Even where Rasayana cannot reverse established dementia, Ayurveda offers measures that may improve comfort and quality of life. Regular Abhyanga (oil massage), Padabhyanga (foot massage) and Shiro Abhyanga can provide calming sensory stimulation and may help with agitation and sleep, although controlled studies are lacking. Pratimarsha Nasya with medicated ghee is traditionally used to nourish the senses and mind in older adults. A regular daily routine, familiar food and calm surroundings are consistent with good dementia care practice.

Ayurveda's attention to the family and household is also relevant. Caring for a person with dementia places a heavy burden on family members, who are at risk of stress and depression themselves. Sattvavajaya counselling, yoga and Rasayana for caregivers could be part of a family-centred approach. Such programmes should be developed in collaboration with geriatric and memory services so that medical needs are met.

Safety considerations

Rasayana herbs are generally well tolerated in trials, but several points need attention. Bacopa commonly causes gastrointestinal symptoms such as nausea and loose stools. Ashwagandha has been associated with rare cases of liver injury. Older adults often take many medicines, increasing the risk of herb–drug interactions, for example with anticoagulants, antidiabetic drugs and sedatives. Mineral and metal-containing Rasayana preparations require testing for heavy metals. Patients with suspected dementia need medical evaluation to exclude treatable causes such as thyroid disease, vitamin B12 deficiency, depression and medication effects.

DISCUSSION:

Ayurveda's account of memory, its analysis of the processes of recall, and its recognition of age-related decline of intellect show a sophisticated understanding of cognition. Its treatment approach, Medhya Rasayana combined with lifestyle and mental discipline, is consistent with current thinking about brain health and dementia prevention.

The evidence for Rasayana herbs is encouraging but incomplete. Bacopa has the most data, mainly in healthy adults. Ashwagandha, Centella and curcumin have promising single trials. The Withania mouse study offers an intriguing mechanism. However, no Rasayana has been shown to slow clinical progression in people with Alzheimer's dementia, and most trials are short and small.

Future research should focus on three groups: healthy older adults (prevention), people with subjective cognitive decline or mild cognitive impairment (early intervention), and people with mild Alzheimer's disease (adjunct treatment). Trials should run for at least 12 to 18 months, use standardised extracts, include validated cognitive outcomes and, where feasible, biomarkers such as amyloid and tau imaging or blood-based markers. Multidomain trials combining Ayurvedic lifestyle principles with Medhya Rasayana would test the integrated approach that Ayurveda actually recommends.

CONCLUSION:

Ayurveda recognises the decline of memory with age and offers Medhya Rasayana and lifestyle measures to preserve cognition. Clinical evidence supports modest cognitive benefits of Bacopa in healthy adults, and promising effects of Ashwagandha, Centella and curcumin in small trials, including one with brain biomarker changes. Rasayana should currently be viewed as a promising preventive and adjunctive approach rather than a treatment for established Alzheimer's disease. Long-term, rigorous trials are needed.

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