A review on pharmacodynamics of Ashtamangal ghrita and its uses in mental and physical growth in children

Vijendra Pratap Singh

Abstract
Ashtamangal Ghrita is a polyherbal formulation as it contain eight drugs – Brahmi (Bacopa monneri Vacha (Acorus calamus), Pippali (Piper longum), Sareva (Hemidesmus indicus), Kushtha (Saussurea lappa), Siddartha (Brassica campestris), Saindhava (Rock salt), and Ghrita (Traditionally prepared butter), oil). This formulation has been used as a Medhya, Smritivardhaka and Rakshoghna (Enhance memory & cognitive function as well as it protect from the infection). The components of this formulation work as nootropic, improve nerve impulse transmission, increasing density of cholinergic neurons in hippocampus, acetylcholinesterase inhibitor and memory enhancing, neuroprotective and antioxidant, and by bioavailability enhancer.

Keywords: Ashtamangal Ghrita, Medhya, Smritivardhaka, Nootropic, Acetylcholinesterase, mental and physical growth

Introduction
Traditional medicines continue to play important roles in health services around the globe. Ayurveda, the traditional medical system of India, describes thousands of herbal preparations. Brain has its maximum growth spurt in the last 3 month of pregnancy and in first two year of life. By the age of 2 year there is marked increase in brain growth, synaptic arborization and the size of the adult brain is almost achieved by the age of 2 years. Undernutrition does not start after birth but it is a continuation of intrauterine malnutrition and when prolonged it lead to growth retardation. Approximately, 150 million children worldwide are malnourished (UNICEF, 2001). This is an alarming number of our population that is at risk of developing learning and behavior problems. The greatest effect of malnutrition on brain development is experienced during the time of rapid brain growth. Insults occurring at this time will have significant negative effects on brain development, cognition, and behavior. Nutrition plays a major role in the development of the nervous system. The severity, timing and duration of malnutrition are important determinants of its possible effect on the neurological development of the child. Proper nutrition with adequate amount of necessary micronutrients, protein and calories given at appropriate time may insure normal brain development.

In classical Ayurvedic texts Lehan Karma is done for the child whose mother is diseased, not having good quality of milk, inadequate lactation and child not getting sufficient amount of milk (undernutrition) or inadequate growth and development without having any disease. Health of the child depends on Lehan. For Lehan Karma, many compounds have been prescribed. Ashtamangal Ghrita is one of them, which is a polyherbal formulation which is used as Rakshoghna (protection from the infection), enhance Medha and Smriti. Therefore, this study was planned to review on Ashtamangala Ghrita and effect on physical growth and mental development, with the expectation that study will help to make an evidence based and more rational Ayurvedic preventive therapy against sequel of undernutrition and also a cognitive promoter in healthy and undernourished children.

Aims and objective
Present work aimed to review the efficacy and probable mode of action of Ashtamangal Ghrita on physical and mental growth in Children.

Materials and Method
This study was done by compiling the classical Ayurvedic literature, Pharmacology (Dravyaguna) and Rasashastra books, research journal.
**Ingredients of Ashtamangal Ghrita:** Ashtamangal Ghrita contains eight drugs –Brahmi (Bacopa monnieri), Vacha (Acorus calamus), Pippali (Piper longum), Sariva (Heimdesmus indicus), Kushtha (Saussurea lappa), Siddarthaka (Brassica campestris), Saindhava (Rock salt) and Ghrita[3].

**Preparation of Ashtamangal Ghrita**

Stainless steel vessel was selected for the preparation of Ashtamangala Ghrita. To prepare the AMG, LPG gas device was used to maintain temperature uniformly during whole process. Before introducing main procedure, Ghrita was heated on moderate temperature for eliminating moisture and foul smell. During main process also moderate heat was given for easy extraction of active constituents, to retain volatile matter and for stabilization of heat labile ingredients. Therefore, we had prepared Ashtamangala Ghrita on moderate temperature. *Sneha* was heated slightly in a vessel and withdrawn from the fire and *Kalka* was slowly added with continuous stirring to avoid burning of the *Kalka*. After homogenous mixing, vessel was kept over the heating devices and *Sneha Paka* processed. Water was added little by little in above mentioned container which is a mixture of *Ghrita* and *Kalka*. Kept it over the heating device for preparation of Ashtamangala Ghrita at moderate temperature till the completion of *Paka*. This sequence facilitates uniform distribution of active principles of *Kalka* in the *Sneha* which ultimately enhance the efficacy of formulation. After completion of *Paka, Sneha* was filtered in warm condition in clean and moisture free steel container through four times folded clean cotton cloth. After *Sneha Paka Siddhi Lakshana* self-cooled and filtered, *Sneha* weighed and then filled into clean container and tightly sealed and caped the mouth of container to avoid any types of spoils factors.

**Pharmacodynamics, Doshaghnata and properties of ingredient in Ashtamangala Ghrita:**

**1. Bramhi (Bacopa monnieri)**[4]
- **Rasa:** Tikta, Kashaya, Madhura
- **Guna:** Laghu, Sara
- **Virya:** Sheeta
- **Vipaka:** Madhura
- **Virya:** Madhura
- **Madhura
- **Virya:** Madhura
- **Vipaka:** Madhura
- **Properties:** Vatahara, Kaphahara, Rasayana, Ayushya, Medhya, Matiprada, Swarya, Prajasthapana, Visahara.

**2. Vacha (Acorus calamus)**[4]
- **Rasa:** Katu, Tikta
- **Guna:** Laghu, Tikhsna
- **Virya:** Usna
- **Vipaka:** Katu
- **Properties:** Vata Kaphahsama, Pittavardhak, Mala Mutravisodhan, Kanthya, Krmihara, Vamak, Dipani

**3. Pippali (Piper longum),**[4]
- **Rasa:** katu
- **Virya:** Anushna
- **Vipaka:** Madhura
- **Guna:** Laghu, Snigdha, Tikhsna
- **Properties:** Deepana, Hridya, Kaphahara, Rucya, Tridosahara, Vatahara, Rasayana, Roca

**4. Sariva (Heimdesmus indicus)**[4]
- **Rasa:** Madhura
- **Guna:** Guru, Snigdha
- **Virya:** shita

Vipaka: Madhura
Karma: Rakshshodhaka, Vishaghna, Tridosahanghna, Dipana, Jvarahara,

**5. Kushtha (Saussurea lappa)**[4]
- **Rasa:** Katu, Tikta
- **Guna:** Laghu
- **Virya:** Ushna
- **Vipaka:** Katu
- **Properties:** Kaphavatasmak, Sukrala, Raktasodhaka, Varnya

**6. Siddarthaka (Brassica campestris)**[4],
- **Rasa:** Katu, Tikta
- **Guna:** Snigdha, ushna
- **Virya:** Ushna
- **Vipaka:** Katu
- **Properties:** Depana, Kaphahara, Pittakara, Vatahara, Vidaha, Hridya.

**7. Saindhava (Rock salt)
- **Rasa:** lavan, madhura
- **Virya:** shita
- **Vipaka:** madhura
- **Guna:**- snigdha, Tikshna, Sukshma
- **Properties:** tridosha shamak, parshva shula, jirakasa, shwasa

**8. Ghee
- **Rasa:** madhura
- **Virya:** shita
- **Vipaka:** madhura
- **Guna:** snigdha
- **Doshaghnata:** tridoshamsak

Various researches works on individual ingredients of Ashtamangala Ghrita

**1. Bramhi (Bacopa monnieri)**
**Mechanism of action based on preclinical studies**

The BM extracts and isolated bacosides have been extensively investigated for their neuropharmacological effects. The triterpenoid saponins and their bacosides are said to be responsible for BM, ability to enhance nerve impulse transmission. It was suggested that bacosides induce membrane dephosphorylation, with a concomitant increase in protein and RNA turnover in specific brain areas5. The other proposal that was put forward was that BM enhances protein kinase activity in the hippocampus which may also contribute to its nootropic action and thus it would aids in repair of damaged neurons by enhancing kinase activity, neuronal synthesis and restoration of synaptic activity and ultimately nerve impulse transmission6.

Oral administration of *Bacopa monnieri* extract at doses of 20, 40 and 80 mg/kg significantly decreased escape latency in morris water maze test and the extract at dose of 40 mg/kg significantly increased the density of cholinergic neurons in hippocampus7.

A study is reported on the effects of Brahmi (*Bacopa monniera*) on human memory. Seventy-six adults aged between 40 and 65 years took part in a double-blind randomized, placebo control study in which various memory functions were tested and levels of anxiety measured. There were three testing sessions: one prior to the trial, one after three months on the trial, and one six weeks after the completion of the trial. The results show a significant effect of the Brahmi on a test for the retention of new information.
2. Vacha (Acorus calamus)
Acetylcholinesterase inhibitory and memory enhancing effect
Methanolic extract has significant inhibition of AchE at 200mcg/ml [8]. In vitro study of Acorus calamus essential oil and its constituents have acetylcholinesterase inhibitory activity.[9-13].

Neuroprotective and antioxidant activity
In one study, exposure of rat to acrylamide caused hind limb paralysis in 58% of the animals on day 10 and decreased behavioral parameters, on treatment by Acorus calamus rhizomes extract neurobehavioral changes were prevented. Neuroprotective potential against middle cerebral artery occlusion (MCAO) induced ischemia in rats. Alcoholic extract exerted protective effect on free radical scavengers and lipid peroxidation.[14].

3. Pippali (Piper longum)
As Bioavailability Enhancer
Piperine is a active principle of Piper longum L., which enhance the bioavailability of drugs.[15, 16]. In experimental study piperine has been opopenozen to enhance the bioavailability of a number of drugs incuding rifampicin, phenytoin, propranolol and theophylline.[18, 19]. A bioassay guided isolation of the ethanol extract from the fruits of Piper longum yielded a known piperidine alkaloid, piperine, as a monoamine oxidase (MAO) inhibitor. Piperine showed an inhibitory effect against MAO-A and MAO-B and antidepressant like activity.[20]. Piperine has many pharmacological actions such as antifungal, antiinflammatory, antioxidiant and anticancer effects.[16]. Experimental studies have also shown their immunomodulatory and anticancer activity.[21, 22].

Saindhava (Rock salt): Charaka has mentioned the following actions imparted by lavana in the body. It is diffusive, liquefacent, digestive, inductive of defluxion, depletive and disruptive, acute, avoids accumulations and obstructions, stiffness and curative of Vata. It is also laxative, overpowers the rest of the tastes and increases the secretion of mouth. It liquefies the mucous secretion, clarifies the passage, softens all the limbs of the body, gives relish to food, is always used in food, is neither very heavy (to digest) nor very unctuous and is hot. Almost all Acharyas of Ayurveda have pronounced the same actions and properties when lavana is used in limits.

Ghrita: Ghrita alleviates pitta and vata, is beneficial for rasa dhatu, sukra dhatu, and ojas. It has sita guna (cooling), mrdukaram (softening), svara prasadanan (improves voice) and varna prasadanan (improves complexion).[23, 24]. In summary, ghee in general and cow ghee in particular, is one of the easily digestible and assimilable food which provides essential nutrients and critical anti-oxidants to the human body for its protection and growth.

Discussion
In classical Ayurvedic texts Lehan Karma is done for the child who is not getting sufficient amount of milk (Undernutrition) or inadequate growth and development without having any disease. For Lehan, there are many yoga prescribed, Ashtamangala Ghrita is one of them. This formulation has been used as a Medhya, Smritivardhaka and Rakshogha (Enhance memory & cognitive function as well as it protect from the infection). In Bhava Prakasha it is mentioned that Ghrita (Ghee) is a rasya tasty, good for the eye, stimulant for digestion, supports slow and beauty, enhances memory and stamina, promotes longevity and protects body from various diseases.[25]. Most Ayurvedic preparations are made with ghee. Digestion, absorption and delivery to a target organ system is crucial in obtaining maximum benefit from any formulation. This is facilitated by ghee. Since active ingredients are mixed with ghee, they are easily digested and absorbed. Lipophilic action of ghee facilitates transportation to a target organ and final delivery, inside the cell, because cell membrane also contains lipid. This lipophilic nature of ghee facilitates entery of the formulation into the cell and its delivery to the mitochondria, microsome and nuclear membrane.

Conclusion: Ashtamangal ghrita is a classical ayurvedic preparation, the present review indicates that it has Medhya, Smritivardhaka and Rakshogha properties. Enhance memory, cognitive function and growth as well as it protect from the infection. Further work required through molecular and clinical research.

References


