



Review Article

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**EFFECT OF KUSHTHADI GHRITA IN ADOLESCENT MENTAL HEALTH PROBLEMS: A REVIEW**Nitu Sinha ^{1*}, Nisha Kumari Ojha ²¹ PhD Scholar, Department of Kaumarbhritya, National Institute of Ayurveda, Jaipur, Rajasthan, India² Associate Professor and H.O.D., Department of Kaumarbhritya, National Institute of Ayurveda, Jaipur, Rajasthan, India

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ABSTRACT

Adolescence is the transitional phase for mental health promotion since more than half of mental health problems begin during this time, and many of them remain into adulthood. These conditions account for 10-20% of the global disease burden. This impacts the individual's likelihood of having an intellectual disability. According to Ayurveda, acharya Kashyap describes a *Kushthadi ghrita* prepared with *Kushtha* (*Saussurea lappa*), leaf-buds of *Vata* (*Ficus benghalensis*), *Gauri* (yellow mustard) (*Sinapis alba*), *Pippali* (*Piper longum*), *Triphala* [*Haritaki* (*Terminalia chebula*), *Amalaki* (*Phyllanthus emblica*), *Bibhitaki* (*Terminalia bellirica*)] *Vacha* (*Acorus calamus*), and rock-salt which is one of the best drugs for improving mental functions (Nootropic activity). The present paper reviews the indications and uses of *Kushthadi ghrita* described in Ayurveda texts. Studies published in various journals regarding the evidence of its ingredient effect are also examined. This *Kushthadi ghrita* drug acts as a *Medhya drug* and *Rasayana*, which is beneficial for improving mental functions. *Medhya drugs* ultimately increase the overall cognitive capacity of the brain, i.e., by increasing perfusion and metabolism and improving the chemical imbalance in the brain. *Rasayana* drugs supposed to increase all the *sharira dhatu*. The ingredients of these drugs have Antioxidant, Anxiolytic, Antistress activity, antidepressant, Neuroprotective, and Anti-amnesic Properties, which are supportive for improving mental functions (Nootropic activity).

Keywords: Adolescence, Mental Health, *Saussurea lappa*, *Ficus benghalensis*, *Sinapis alba*, *Piper longum*, *Triphala*, *Acorus calamus*, and rock-salt.

INTRODUCTION

Adolescence is one of the most crucial phases of human development. Younger adolescents may be particularly vulnerable when their capabilities are still developing, and they are beginning to move outside the restrictions of their families. The World Health Organization (WHO) defines adolescents as those people between 10 and 19 years of age. Mental health conditions account for 10-20% of the global burden of disease and injury in people aged 10-19 years ¹. The prevalence of intellectual disability is 1% in the general population. While most individuals have mild intellectual disability, 6 per 1,000 individuals have severe intellectual disability ². According to

Ayurveda, acharya Kashyap describes a *Kushthadi ghrita* prepared with *Kushtha* (*Saussurea lappa*), leaf-buds of *Vata* (*Ficus benghalensis*), *Gauri* (yellow mustard) (*Sinapis alba*), *Pippali* (*Piper longum*), *Triphala* [*Haritaki* (*Terminalia chebula*), *Amalaki* (*Phyllanthus emblica*), *Bibhitaki* (*Terminalia bellirica*)] *Vacha* (*Acorus calamus*), and rock-salt as one of the best drugs for improving mental functions (Nootropic activity) ³. The present paper reviews the indications and uses of *Kushthadi ghrita* described in Ayurveda texts. Studies published in various journals regarding the evidence of its ingredient effect are also examined. The clinical and experimental efficacy of each ingredient is reviewed and discussed here.

Table 1: Ingredients and the part used in *Kushthadi ghrita*

| Name of drugs | Botanical Name | Family | Part used | Proportion |
|------------------------|-----------------------------|----------------|-----------|------------|
| Kushtha | <i>Saussurea lappa</i> | Asteraceae | Root | 1 part |
| Vata | <i>Ficus benghalensis</i> | Moraceae | Leaf-buds | 1 part |
| Gauri (yellow mustard) | <i>Brassica campestris</i> | Cruciferae | Seed | 1 part |
| Pippali | <i>Piper longum</i> | Piperaceae | Fruit | 1 part |
| Haritaki | <i>Terminalia chebula</i> | Combretaceae | Fruit | 1 part |
| Amalaki | <i>Phyllanthus emblica</i> | Phyllanthaceae | Fruit | 1 part |
| Bibhitaki | <i>Terminalia bellirica</i> | Combretaceae | Fruit | 1 part |
| Vacha | <i>Acorus calamus</i> | Acoraceae | Root | 1 part |
| Rock-Salt | | | | 1 part |

KUSHTHA: *Saussurea lappa*

Family: Compositae

Pharmacological actions

Use as brain tonic- It is also used in the Unani system of medicine as it stimulates the brain and is used to treat deaf, headache, paralysis, asthma, Cough, old fever, inflammation, and ophthalmic conditions⁴. The smoke of roots powder used as a substitute for opium, when inhaled, makes the patient fall asleep fast⁵.

VATA: *Ficus benghalensis*

Family: Moraceae

Pharmacological actions

Cognitive enhancing activity-In Passive-avoidance test and plus-maze tests on scopolamine-induced amnesia in young mice, the aqueous extracts of *Ficus benghalensis* bark did have cognitive-enhancing activity and mitigated scopolamine-induced memory deficits⁶.

Antistress and antiallergic- The aqueous, ethanol, and ethyl acetate extracts of *Ficus benghalensis* bark showed a significant decrease in leukocytes and eosinophils in the order given. In contrast, petroleum ether and chloroform extracts were inactive. This shows the polar constituents of *F. benghalensis* bark as antistress and antiallergic agents in asthma⁷.

Useful in short-term memory- In the Passive-avoidance test, there are tried to explore the effect of the drug on the short-term memory of the mice. Among three parameters, step-down latency and step-down error were statistically not significant. Third parameter- Time spent in shock zone pointed towards beneficial effects of high dose of the extract in short-term memory of the mice. Central cholinergic receptors are often involved in memory⁸.

Anti-amnesic effects- The aqueous extracts of aerial roots of *Ficus benghalensis* L. are effective in learning and memory. Chandra P et al. found that aqueous extract from the bark of *Ficus benghalensis* L. mitigated scopolamine-induced memory deficits in the Passive-avoidance test⁹. Other taxonomically close plants also have proven anti-amnesic effects like *Ficus religiosa* in scopolamine-induced anterograde and retrograde amnesia. *Ficus religiosa* fig extract (FRFE) has anti-amnesic activity against scopolamine-induced amnesia in a dose-dependent manner. Inhibition of the anti-amnesic effect of FRFE by cyproheptadine substantiates the involvement of serotonergic pathways in its activity¹⁰⁻¹¹.

Useful in various nervous disorders- In the traditional system of medicine, different plant parts of *Ficus benghalensis* L., such as stem bark, aerial roots, underground roots, vegetative buds, leaves, fruits and latex, have been used in various nervous disorders, i.e., seizure, insomnia, anxiety etc.¹²⁻¹³. Basu and Lal described many neuropharmacological effects of the plant¹⁴.

Anti-anxiety effect- The aqueous extracts of aerial roots of *Ficus benghalensis* L. are used in anxiety. The open-field test is a valid animal model of anxiety-like behaviour and is based on the conflict between exploring a new environment and the aversion to open spaces from which escape is prevented by a surrounding wall¹⁵.

In the previous study, mice treated with a higher dose of the extract of *Ficus benghalensis* L. spent more time in the central

square even when compared to Diazepam, suggesting an anxiolytic effect even better than the conventional anxiolytic. But many other plants of the same genus have proven anxiolytic effects. *Ficus exasperata* Vahl¹⁶ *Ficus religiosa*¹⁷ *Ficus pumila*¹⁸.

GAURI (YELLOW MUSTARD) (*Brassica campestris*)

Family: Cruciferae

Pharmacological actions

Antioxidants: Mustard seeds treat various conditions, including leukoderma, cracked skin, fever, leprosy, wasting, swelling, rheumatoid arthritis, neurological disorders, gynaecological disorders, breast milk issues, wounds, and placental retention. Mustard leaf has antioxidant properties as well¹⁹.

Mustard oil contains a high quantity of carotenoids. The diverse function of carotenoids, such as anti-ageing, has been reported and plays a vital role in normal vision, good health of epithelial tissues and skin, promote physical development²⁰.

Appetizer: As an appetiser, a healthy meal stimulates appetite by producing fluids. Mustard oil aids digestion by increasing digestive juices and eliciting a desire to eat²¹.

Antibacterial or antifungal: Mustard oil contains glucosinolate (30 mol/g), which has antibacterial, fungicidal, and cancer-prevention properties and performs therapeutic purposes for human health. Ally Isothiocyanate is an antifungal compound that helps prevent food against fungus development and infection. Mustard oil's antibacterial and antifungal qualities aid in treating bacterial and fungal infections²²⁻²⁴.

PIPPALI (*Piper longum*)

Family: Piperaceae

Pharmacological actions

Antidepressant activity: Ethanol extraction of *P. longum* fruits provides a monoamine oxidase inhibitor known as piperidine and piperine. As a result, the piper longum fruits are a viable pharmacotherapeutic candidate for treating depression²⁵.

Anti-inflammatory activity- Using carrageenan-induced rat oedema, *P. longum* fruit decoction was a robust anti-inflammatory effect²⁶⁻²⁷.

Bioavailability enhancers- Due to its facile partitioning and increased permeability, piperine has been demonstrated to improve the bioavailability of structurally and therapeutically diverse medicines, potentially through influencing membrane dynamics. It's unclear how this chemical enhances bioavailability. We believe that this trait is due to enhanced absorption, which could be induced by changes in membrane lipid dynamics and enzyme conformational shift in the intestine. Piperine has also increased phenytoin oral bioavailability in humans²⁸⁻³⁰.

Antioxidant activity- Antioxidant ability of *P. longum* against free radical-induced oxidative damage seems promising. Piperine and petroleum ether extracts of the root of *P. longum* Linn. reduce lipid peroxide levels while maintaining glutathione levels, suggesting antioxidant action³¹.

Pippali's roots in jaggery are used to treat insomnia. (ii) To relieve migraine pain, a mixture of "peepal" and "bach" is given in milk³².

Rasayana effect- The usage of *Pippali* as a *Rasayana* (immune modulator) is one of the exceptions to long-term use. Linctus form has been highlighted, and it is *Anupana* for its optimal benefit while using *Pippali* in powder form (vehicle to carry the drug). *Rasayana* tries to improve dhatus (tissue) quality by introducing active herb components. This improves their structural and functional integrity. A significant amount of a specific plant must be administered, but not all at once for this to happen. As a result, a steady increase is advised to load the tissue with medicinal compounds 33 progressively.

HARITAKI (*Terminalia chebula*)

Family: Combretaceae

Pharmacological actions

Antistress activity- *Triphala* has been demonstrated in animal experiments to protect against cold-induced stress and reverse stress-induced stress 34.

Antioxidant and neuroprotective properties: *Terminalia chebula* (TC) water extract has total phenolic and tannin content. The antioxidant activity of the water extract appeared to be relatively high. Tannins are thought to have neuroprotective properties, countering 6-hydroxydopamine-induced toxicity. Tannic acid has shown promise as a potential medicinal agent, and it could be beneficial in the future 35.

Anxiolytic and Antidepressant Activity: Aqueous extract of *Haritaki* is an excellent anxiolytic and antidepressant activity when evaluated against standard drugs diazepam and imipramine, respectively. Tanin rich extract of *Haritaki* resulted in down-regulation of serum cortisol level and maintained a level of 5HT and dopamine in the blood, presenting anxiolytic activity.

Migraine relief- Seeds are crushed in warm water and applied to the forehead to relieve migraines 36.

AMALAKI (*Phyllanthus emblica*)

Family: Phyllanthaceae

Pharmacological actions

Improved cognitive functions- According to metabolic studies, AbPP-PS1 animals have poor neuronal glucose oxidation throughout the brain. The most intriguing finding of this study is that *Amalaki Rasayana* treatment improved memory and neurometabolic activity in AbPP-PS1 mice in a manner that was nearly identical to donepezil-treated AbPP-PS1 mice, implying that *Amalaki Rasayana* has an excellent potential to enhance cognitive functions in AD 37.

The previous study demonstrated that the ethanolic extract of PE (EEPE) fruits had significant beneficial effects on learning, memory, and antioxidant potential. The Unripe fruit had considerable cognitive boosting benefits among ripe and unripe fruits compared to the standard. As a result, this plant extract may be beneficial in treating various ailments 38.

BIBHITAKI (*Terminalia bellirica*)

Family: Combretaceae

Pharmacological actions

Anti-depressant activity: A previous study used the forced swim test (FST) and tail suspension test (TST) to investigate the antidepressant efficacy of aqueous and ethanolic extracts of *Terminalia bellerica* fruits in Swiss young male albino mice 39.

Antistress activity: *Triphala* has been linked to reducing oxidative damage caused by cold. Cold stress-induced oxidative stress and elevations in LPO and corticosterone are reduced when *Triphala* (1 g/kg/body weight/48 days) is consumed. The antioxidant property of *Triphala's* superoxide radical scavenging activity using xanthine and xanthine oxidase activity revealed that, in addition to reacting with superoxide radicals, it also reacts with other antioxidants 40.

VACHA (*Acorus calamus*)

Family: Araceae

Pharmacological actions

Antidepressant Effect- Interaction of the methanolic *A. calamus* rhizome extract with the adrenergic, dopaminergic, serotonergic, and GABAergic systems was found responsible for the expression of antidepressant activity 41. Sobers capsules (a Herbo-mineral formulation containing *A. calamus*) were evaluated by tail suspension and forced swimming tests in mice. At the oral dose of 50 mg/kg for 14 days, capsules exhibited an insignificant impact on locomotor activity and caused antidepressant effects in experimental animals 42.

Rasayana effects- *A. calamus* (*Vacha*) is regarded in Ayurvedic medicine as promoting *Rasayana* effects and has been used to treat memory loss 43,44. *A. calamus* is used in Ayurvedic medicine regularly to treat memory loss and other mental disorders 45. *Vacha* with *Ghrita*, *Swarna Bhasma* and *Bilva Churna* increases life longevity and intellect 46. Intake of *Vacha* with milk for 12 days will increase auditory perception, and continuation for the next 12 days increases the memory power & for the other 12 days increases the grasping power & the next 12 days, a continuation of the same regimen sharpens the visual acuity like *Garura* 47.

Rock-Salt: This is the common name for the mineral "halite". Its chemical formula is NaCl. It is known as Sendha Namak in Hindi and is a highly crystalline salt. It is very highly regarded in Ayurvedic tradition. It is an essential part of the diet without which food becomes tasteless. It is required for small quantities of plants and animals but harmful when present in more than 48. The two significant components of salt are chloride and sodium ions. At the same time, other elements are present in minute quantities like potassium, magnesium, calcium, sulfate ions, iron, zinc, nickel, chromium, cadmium, manganese, copper & cobalt, which are required for average body functioning 49. The human body needs some essential and non-essential heavy metals in minute quantities. Therefore, it is necessary to check the salt quality in terms of essential and non-essential heavy metals as it is the primary food item used daily. Some benefits of rock salts are given below 50.

- a) **Skin benefits:** It helps in exfoliating dead skin cells, cleansing skin pores and protecting the natural skin layer to produce a healthy and energised skin type. It also helps strengthen skin tissue to rejuvenate the skin to look younger and firm.
- b) **Antioxidant:** It helps eliminate toxic minerals and refined salt deposits by stimulating blood circulation and mineral balance.
- c) **As a health monitor:** The use of rock salt helps stabilise blood pressure by maintaining a balance of high and low blood pressures. It also helps control weight by equalising minerals that inhibit cravings and eliminate fat dead cells.
- d) **As a Cure:** Rock salt is used as a home remedy to cure many disorders and ailments. It treats skin disorders and other conditions such as rheumatic pains and herpes. It can also be consumed with lemon juice to eliminate stomach worms and control vomiting. The common cold and cough and other

nasal and chest ailments can be treated with recipes that involve rock salt as the main ingredient. It is even used to reduce pain, inflammation and irritation from insect bites.

- e) **Relieves Stress**⁵¹: Consuming a bit of rock salt in soups or salads, or even taking a bath in warm water imbued with the crystals, instantly augments nervous system functions, activates the brain and relaxes the mind. This assists in lowering stress levels, reducing the risk of chronic diseases like diabetes, heart disease and cancer, and ensure.

Therefore, rock salt is considered a complete body-mind package; it contributes to the body internally, the skin externally, and the health of the mind.

DISCUSSION

This drug *Kushthadi ghrita*, described in Kashyap Samhita, is the best drug for improving mental functions (Nootropic activity). *Kushthadi ghrita* have *Laghu*, *Ruksha*, *Tikshna* and *Snigdha* Guna (Qualities) predominantly; *Katu*, *Tikta Rasa*; *Ushna Virya*; *Madhura* and *Katu Vipaka*; *Kapha-vata* and *Tridosha shamaka* and *Medhya Prabhava*. *Laghu Guna* increases the *Sattva* part of *Mana*. *Ruksha & Tikshna Guna* dispel the *Avarana* of *Tama* and increase the *Sattva*. *Snigdha Guna* improves the qualities of the *Tarpaka Kapha* and thereby nourishes the *Mana & Indriyas*. *Katu Rasa* dominates in *Agni Mahabhuta*, may also help to reduce the symptoms that occur due to stress response as- *Agnideepana* (Stimulation for enzymatic secretion), *Bhuktasosayati* (secretion of enzymes and neurotransmitters as serotonin for digestion of food), *Rochayatyasana* (proper digestion and metabolism, it stimulates appetite), *Margana Vivarnaut* (proper channelling of neuro-anatomical consideration and functional brain)⁶⁴. *Tikta Rasa* being predominant in *Akasha Mahabhuta*⁶⁵ increases *Sattva Ansa* of *Mana*. The other probable actions of *Tikta Rasa* may also help to reduce the symptoms that occur due to stress responses, such as *Arochakaghna* (treat loss of appetite), *Deepana* (increases metabolism) and *Pachana* (digestion)⁶⁶. *Ushna Virya*, by its *Vata* alleviating effect, pacifies the vitiated *Vata dosha* in conditions like academic stress. At the same time, *Ushna Virya* helps increase blood circulation in the brain. *Katu Vipaka* increases the overall metabolism in the body, proper enzymatic secretions, thereby minimising the nutrients deficiencies and stimulating all the sense organs. *Madhura Vipaka* is said to improve all the *Sarira Dhatu*, including brain tissues, and nourishes *Mana* and *Indriya*⁶⁷. *Medhya* drugs ultimately increase the overall cognitive capacity of the brain by any one of these mechanisms, i.e., by increasing perfusion and metabolism and improving the chemical imbalance in the brain. *Rasayana* drugs are supposed to grow all the *Sharira Dhatu* quantitatively and qualitatively.

The ingredients of these drugs have Antioxidant, Anxiolytic, Antistress activity, antidepressant, Neuroprotective, and Anti-amnesic Properties which are supportive for improving mental health. Children with cognitive impairment are at a higher risk for mental illness. This drug helps to improve the cognitive function of children. Adolescents with working memory deficits often face problems in academic performance day to day activities, leading to behavioural problems. Sometimes, due to poor academic performance, they attempt suicide, the most common cause of death in adolescents. By improving intellectual power, the prevalence rate of suicide decreases. Academic stress is concerned with the brain or *Mana* and *Buddhi* in Ayurveda. So *medhya* property is eventually useful in decreasing academic stress, anxiety and depression.

CONCLUSION

Adolescent mental health disorders are a severe concern that is quite prevalent and treatable. The current study explores the effects of *Kushthadi Ghrita* on adolescents for improving cognitive functions (Nootropic activity). The ingredients of *Kushthadi Ghrita* have been shown to have a therapeutic impact on adolescent mental functions, reducing internalising and externalising symptoms and improving attitude.

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