

The Relevance of Immunomodulatory effect of *Brahmi*, *Shankhpushpi* and *Ashwagandha* in children: Insights from Ayurvedic Texts in the Modern Era

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Abstract- Ayurveda, the stream of traditional medicine works on the principle of firstly in saving people's health. Paediatrics is one of the important branch and childhood is the building block of life. In our ancient texts, according to *Charaka Samhita* immunity varies from person to person. So, the concept of immunity is not new as it is already mentioned in *Charaka Samhita* which is of 2nd Century. Immunity is when the immune system recognizes micro-organisms and other foreign material, discriminate it from self and mounts an appropriate response to eliminate it. Immunization is the administration of all or part of a pathogen or performed antibodies to elicit an immunological response that protect from disease. But as we can say, the way a coin has two sides, similarly modern medicine comes with its effects and side effects. But to compensate this, use of immuno-modulator is the need of modern era. In our ancient text from *Kashyapa Samhita* mainly immuno-modulators are described under the term "*Lehana*" so the use of immuno-modulators are not new as they enhance the cognitive function, mental and physical state.

Key Words: Immunity, *Vyadhi kshamtva*, Immunisation, Immuno-modulators, *Lehana*.

Introduction:

Childhood is the building block of life. "A Strong House can build only when the foundation is strong so this same applies for a healthy life." Today's era is a technological era, an era of hustle and bustle but unfortunately it is an era of adulteration, due to which children fall sick again and again due to their nutritional needs not being met and their immunity become weak. Children have to pay for repeated use of medicines by putting their immunity at stake. Extra supplements are very crucial thing to be given to children so that they can lead a happy life. In our ancient books, various texts are given for the person's immunity. Like in *Charaka Samhita*, *Acharya Charaka* firstly described about the *Rasayana* in *Chikitsasthana* as *Ayurveda* runs on the principle of "*Swasthasya Swastha Rakshnana*"¹ and use of *Rasayana* is totally encouraging this aspect and *Acharya Charaka* gave the definition of *Rasayana* as "*Labhopyo Hi Shastanam Rasadinam Rasayanam*"² *Rasayana* is that preparation which helps to maintain and increase the *Dhatu*s of human body thus maintain the well-being of human body. *Acharya Kashyapa* use the term "*Lehana*" to describe the immunomodulation as "*Sukhm Dukhm Hi Balanam Drishyate Lehan Ashrayam*"³. The healthy and unhealthy condition of the child depend on the *Lehana*. These terms "*Rasayana*" and "*Lehana*" are very broad term which includes nomenclature like antioxidants, immuno-modulators, mental agility, stress, radical scavengers etc.

Aims and Objectives:

To review the effect of immuno-modulators on child's growth and development by assessing different aspects.

Material and Methods: The details were collected from different *Ayurveda* texts, reputed articles, journals, internet and different kind of guidance by our respected teachers.

Detailed description of drugs: Children are way more sensitive than adults, so special care needs to be taken to use any kind of drug whether single or in preparation.

Rasayana act differently on body system like:

- By increasing salivation, thus help in the child with *Aruchi*.
- As it increases mobility of GIT, thus helps in problem of *Vibandha*, *Avipaka* etc.
- *Rasayana* has property of revitalization thus help in increasing the strength of body.
- Use as immuno-modulators thus increasing the resistance against common diseases whether seasonal, infectious and other.

- It helps to withdraw the toxins from body thus helps in detoxification.

Role of *Brahmi, Shankpushpi and Ashwagandha* as immuno-modulator in children: -

1. **BRAHMI:**

Ayurvedic pharmacological actions: -

<i>Rasa</i>	<i>Tikta</i>
<i>Guna</i>	<i>Laghu</i>
<i>Veerya</i>	<i>Ushna</i>
<i>Vipaka</i>	<i>Katu</i>
<i>Prabhava</i>	<i>Medhya</i>

Properties of *Brahmi* in different *Ayurvedic* texts:

- *Brahmi* is *Saraka*, beneficial for intelligence, memory enhancer etc. ⁴
- *Brahmi* gives wisdom (*Buddhi*), intelligence (*Pragyashakti, Medhashakti*) and increases longevity (*Ayurvedhaka*).⁵
- The quality of *Brahmi* is said to calm the mind. ⁶
- *Brahmi* is *Medhya, Swarya*, work as an excellent brain enhancer, beneficiary for heart, increases longevity etc.
- *Brahmi* is *Ayushya, Vayasthapana, Medhya, Vagvardhini, Svarya* and *Hridya*. It cures *Unmada* etc. ⁸

Chemical constituents and its uses:

- Bacosides - Primary active compound. Enhance cognitive function and improve memory retention.
- Alkaloids – Brahmine and herpestine are present. Work as sedative and relaxant properties. Also have stress-relieving effects.
- Flavonoids - They are having antioxidant properties, help in scavenging of free radicals thus promote reduction of oxidative stress and inflammation.
- Saponins - As they possess adaptogenic properties which help to adapt the stress to body.

Different pharmacological action of *Brahmi*: ⁹

- ❖ Effects on anxiolytic activity - A clinical study shows that reduced anxiety seen in rats when treated with the herb. Without changing the brain's neurochemistry there is a result of the decrease in the activity of experimental animals. A study reveals effects of anxiolytic activity of *Brahmi* and lorazepam similar but in a dose-dependence, when *Bacopa monnieri* extracts contain Bacoside A in amount of 25.5%.
- ❖ Tonic for the nerves - Since ancient times, the herb has been used as a tonic for enhancement of memory. First time effect of *Brahmi* on CNS was mentioned in *Charaka Samhita* for mental diseases which include different symptom like intellectual weakness, anxiety etc. A study shows the effectiveness of *Brahmi* with drugs like chlorpromazine on rats' ability to learn "basic motor learning test" has been compared and evaluated.
- ❖ Anti-inflammatory properties – The drug exerts its anti-inflammatory effects by inhibiting prostaglandin synthesis or action and possibly by stabilizing lysosomal membranes. Its anti-inflammatory properties are comparable to those of indomethacin.
- ❖ Stress-Reduction - The effects of immuno-modulators such as *Brahmi* etc. were investigated on the levels of neurotransmitters in the brain of normal and stressed rats. These drugs significantly increased acetylcholine levels in cortex while reducing them in the whole brain. Moreover, they elevated catecholamine and 5-hydroxytryptamine concentrations particularly notable in stressed rats. These finding suggests that besides functioning as tranquilizers, these medications may enhance mental performance.

2. **SHANKHPUSHPI:**

Ayurvedic pharmacological actions: -

<i>Rasa</i>	<i>Tikta</i>
<i>Guna</i>	<i>Snigdha, Pichila</i>
<i>Veerya</i>	<i>Sheeta</i>
<i>Vipaka</i>	<i>Madhura</i>
<i>Prabhava</i>	<i>Medhya</i>

Properties of *Shankpushpi* in different *Ayurvedic* texts:

- *Shankpushpi* is especially *Medhya*. ¹⁰
- *Shankpushpi* is *Sheeta Veerya, Tikta Rasa, Medhya* and *Swarya* helps to destroy *Graha, Bhoota, Doshas* from the body. ¹¹

- There are different method for consuming *Shankhpushpi* in patients suffering from *Attatva- abhinivesh*.¹²
- *Shankhini Rasa Katu, Tikta, Veerya Ushna*, it helps in reduction of *Pitta, Kapha, Kasa, Apasmara* etc. and help in enhancing *Medha* and work as *Rasayana*.¹³
- *Shankhpushpi Rasa Kashaya, Ushna Veerya, Saraka, Medhya, Vrishya*, cures mental illness work as *Rasayana*, help to increase memory, immunity, digestive fire, etc.¹⁴
- *Vishnukranta Rasa Katu Tikta* and give wisdom, intelligence and memory.¹⁵
- It is *Saraka* in nature, *Medhya* cures *Unmada* etc.¹⁶

Chemical constituents and its uses:

- Alkaloids - Convolvine, convolamine and shankhpushpin help in enhancing cognition, having anxiolytic and sedative effects.
- Flavonoids - Antioxidant in nature. Help in scavenging free radicals in body, reduction of oxidative stress and inflammation.
- Glycosides - These are compound composed of a sugar and non- sugar molecule possess potential of cardiovascular benefits and anti-inflammatory properties.
- Coumarines - These are aromatic in nature having properties of anti-coagulation, anti-oxidation and anti-inflammation.

Different pharmacological action of *Shankhpushpi*:¹⁷

- ❖ Nootropic Potential - *Shankhpushpi* contains volatile oil, fatty alcohols, flavonoids and carbohydrates like glucose, sucrose contributing to its potential as nootropic agent. Additionally, an alkaloid called convolvine present in this plant inhibits cholinergic muscarinic receptor M2 & M4 while also enhancing the effects of other memory enhancer. In a study, the petroleum ethanolic and aqueous methanolic ether extracts from CP demonstrated nootropic activity, assessed through Elevated Plus Maze (EPM) and step-down models in mice.
- ❖ Neuroprotective function - The aqueous extract from the roots of *Shankhpushpi* demonstrated neuroprotective effects by inhibiting acetylcholinesterase activity in the hippocampus and cortex of male wistar rats intoxicated with scopolamine. Additionally, the CP extracts exhibited antioxidant properties and increased levels of enzymes like glutathione reductase in cortex and hippocampus.
- ❖ Anti-inflammatory property - Hydroxy- cinnamic acid, a phenyl-propanoid compound present in CP, its ability to down regulate the expression of cytokine mediators like 1L-8, MCP-1 & ICAM-1. This action inhibits the expression of cytokine-mediated adhesion molecules, thus impeding the fundamental process of leukocyte- endothelial cell adhesion. Consequently, CP may contribute in alleviating neuro-inflammation and subsequent cognitive impairment.

3. ASHWAGANDHA:

Ayurvedic pharmacological actions: -

Rasa	<i>Tikta, Katu, Madhura</i>
Guna	<i>Laghu, Snigdha</i>
Veerya	<i>Ushna</i>
Vipaka	<i>Madhura</i>
Prabhava	<i>Balya</i>

Properties of *Ashwagandha* in different *Ayurvedic* texts:

- *Ashwagandha Katu Rasa, Kashaya Rasa* and *Ushna Veerya*. It is *Balkaraka, Vatnashaka* in nature.¹⁸
- *Ashwagandha* is *Kashaya Tikta Rasa, Ushna Veerya, Kshaynashaka, Kanti, Balvardhaka* etc.¹⁹
- In PEM etc. quantity of ½ - 1 *Tola* coarse powder is heated in some ghee and mixed with milk and sugar. It is very nutritious and helpful for child and prevent them from nutritional deficiency.²⁰
- *Ashwagandha* boost immunity (*Bala*) and strength (*Pushti*).²¹

Chemical constituents and its uses:

- Withanolids - Naturally occurring steroid found primarily in roots, responsible for its various pharmacological actions such as adaptogenic properties.
- Alkaloids - Somniferine, somnine & anferine. It modulates the body's system to stress and reduce the effect of cortisol like stress hormones.
- Steroidal lactones – Withaferines A, withanones etc. which are believed to have therapeutic effects
- Saponins - It is present in herb by contributes its effect as adaptogenic and antioxidant properties.
- Flavonoids - These are polyphenolic compounds and with antioxidant properties, help to scavenge free radicals and thus reduce oxidative stress.

Different pharmacological actions of *Ashwagandha*:²²

❖ Adaptogenic properties - In a double-blind clinical trial involving 60 healthy children aged 8-12 years, the oral intake of 2g/ day of root powder for 2 months resulted in increased body weight, total protein levels, mean corpuscular haemoglobin. In a related study, healthy male volunteers were also given 3g/ day of root powder and shows significant results.

❖ Growth promoting properties – In a double-blind study spanning 60 days, the growth promoting effects of WS were examined in 60 healthy children aged 8-12 years divided into 5 five groups of 12. Group I received purified and powdered WS at a dose of 2g/ day mixed with 100cc of milk. Group 2 was administered a daily dose of 2g of blend containing equal parts WS and *Punarnava*. Group 3 and 4 received ferrous fumarate at doses of 5mg/ day and 30mg/day respectively, while group 5 received a placebo. It was observed that out of 15 children, 13 experienced an increase in body weight, 10 had elevated haemoglobin and packed cell volume levels and 11 showed higher serum iron levels. The study underscores the potential of WS as a growth promoter.

Discussion:

Children are fundamental to society's foundation. With infection rates escalating daily, paediatric textbooks universally advocate for immunization programmes. However, these remains significant uncertainty surrounding vaccines administration to children who are immuno- - compromised or suffering from ailments like diarrhoea and fever. In contrast, the fore mentioned herbs collectively act as potent health enhancers. While vaccines primarily target infections, these herbs offer protection against both infections and non-infectious diseases, including malnourishment. Unlike vaccines, which may have both known and unknown side effects these herbs possess no such risks. Therefore, these remedies hold promise as supporting children's overall health and addressing nutritional deficiencies.

Conclusion:

Childhood forms the foundation of life. Just as a sturdy house requires a solid foundation, a healthy life depend on a strong start in childhood. So, for the management of paediatric diseases according to ancient science can be achieved through the use of herbal remedies. These immuno-modulators aim to enhance memory, improve cognitive abilities, increase tolerance, enhance concentration etc. They operate at the level of bodily fluids, enhance digestion and clear subtle channels thereby promoting the flow of vital fluids. In conclusion *Brahmi*, *Shankpushpi* and *Ashwagandha* hold great potential as immuno-modulators for children. Their natural attributes may enhance children's immune response potentially helping prevent and manage a range of illnesses. These indigenous plants have undergone rigorous preclinical and clinical testing across different disease conditions, affirming their therapeutic efficacy and prominence in Indian medicine.

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