



IMMUNOMODULATORS IN AYURVEDA: A BOON FOR CHILDREN DISORDERS

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ABSTRACT

India has attained a fast decline in Infant mortality rate in recent few years. The IMR has dropped by an average rate of 4.56% per year over last five years. Despite of high advances in immunisation to boost up the defence mechanism, the medical science is yet to reach a full proof mechanism against the virulent organism and sometimes we lose out in battle of survival. However, an immune system is a system of biological structures and processes within an organism that protect against diseases by identifying and killing pathogens. The process of rendering a subject immune or becoming immune is called immunization. At the current pace, the country will miss the target to achieve the fourth Millennium Development Goal (MDG-4), which aims to reduce under-five mortality rate and IMR by two-thirds between 1990 and 2015. So, there is need of improvement in current immunization schedule. In *Ayurvedic* texts immunity has been explained in term of *Vyadhikshamatva*. *Ayurveda* bears therapeutic strategy such as *Lehana Karma*, *Suvarna Prashana*, *Rasayana*, etc. That enhances the body's overall natural defence to the disease-causing agents rather than directly neutralising the agent itself. In this to elaborate the management of such common diseases which are prevalent in this era like LBW, Mental retardation, Malnourishment etc which would help to tackle such problems without inculcating their long-term side effects on the infants.

KEYWORDS : Immunization, *Vyadhikshamatva*, *lehana karma*, *Suvarna Prashana Rasayana*.

INTRODUCTION

Almost 75% of all child deaths are attributable to just six conditions: neonatal causes, pneumonia, diarrhoea, malaria, measles, and HIV/AIDS. Respiratory infections and diarrhoeal diseases together contribute to 36 per cent of all deaths in children under five years of age. 80% of these deaths occurs in the first 2 year of life, main causes being dehydration, complication associated with dysentery, malnutrition, and serious infection such as pneumonia. These statistics show that children are more vulnerable to infection because their immune system is less or under developed. Recurrent respiratory infection and diarrhoea are the most common causes of morbidity in immune compromised children. Majority of children below the age of 5 years do get 7-8 episodes of cold per year and more than 2 million deaths are estimated to result each year the world over because of diarrheal disease in children of under five years. Immune system continues to develop as the infant grows. In this period attempt should be done for prevention of disease and to enhance physical, mental and social wellbeing of children so that each child may achieve the genetic potential with which she/he born. At this time if a method is developed or reintroduce from the treasure of *Ayurveda*, it will be a boon in the field of preventive paediatrics. In *Ayurvedic* texts immunity has been explained by *Acharya Chakrapani* in term of *Vyadhikshamatva*. According to *Ayurveda* *Ojas* is considered as *Bala* or *Prakrita Kapha* attributed to immunity².

Different therapies like *Rasayana*, *Lehana*, *Orjaskara*, *Jeevniya*, *Balya*, *Sanskaras* etc. are focused to modulate the immunity or increase the *Vyadhikshamatva*.

Specific drugs like *Rasayana* and *lehana* in *Ayurveda* acts to prevention of disease and promotion of health by improving immunity or *Kshamatva*. *Ojas* play an important role in maintaining the resistance power of the body and it is extract of all the *Dhatus*. So, the drug *Rasayana* and *Lehana* are responsible to potentiate *Ojas* or intermediate *Dhatus* directly or by enhancing *Dhatwagnies* or by *Srotoshodhanam*.

Methods to Boost up Vyadhikshamatva:

In *Ayurveda* texts, various codes of conducts are described for each persons of any age (from conception to old age) to follow in different seasons, during healthy and diseased conditions in terms of dietetic (*Ahara*) and mode of life (*Vihar*).

In case of childhood age group *Lehana Karma* and *Rasayana* therapy are very beneficial for boost up the immune system. These are:

LEHANA KARMA:

In *Ayurvedic* texts, various *Acharyas* described countless useful *Dravya*, formulations (*Yogas*), mode of conducts for adults to enhance immunity (*Bala* or *Vyadhikshamatva*), similarly for healthy *Ksheerapa* (infantile period), *Ksheerannada* (1-2years age period) and *Annada-Awastha* (age period from 2-16 years). *Acharya Sushruta*, *Acharya Vagbhata* & *Acharya Kashyapa* describe a special formulation by the name of "*Lehana*", for this purpose which enhances immunity and thus minimises infection episodes. The term *Lehana* means the act of licking or lapping up with the tongue. Children are very susceptible to the infections. There are so many traditional measures available to combat it and protect from the hostile environment in which drug is mixed with honey or *Ghrita* are given. The process is called *Lehana*. So, it is the ideal way of administering drugs in children because it increases the palatability of the drug taken with it and can be easily taken up. This is the most accepted mode of the drug administration to child.

Facts about Lehana -:

Different *Acharyas* described various *Lehana* formulations (*Balawardhanyogas* or strength promoting formulation) for use in *Balyaawastha* (or during childhood period).

Lehanakarma's purposes:

1. To enhances growth & development by providing sufficient nutrition.
2. Promote health, complexion and strength (immunity).
3. Protect from various infections along with improving intellect and speech (delayed milestone)

Indication of Lehana -

children receiving inadequate amount of breast milk due to pregnancy of mother, children having increased demand of food, children passing less amount of urine and stool, children: very lean & thin without any organic problems³

Contraindications of Lehana -

children having improper digestion, lethargic, passing excessive amounts of urine & stool, suffering from various disorders like eye, ENT disorders (*Shiroroga*), fever, diarrhoea, oedema, jaundice, anaemia, cardiac problems, rectal disorder, excessive vomiting & nausea, abdominal discomforts, *Amaroga* (disorders due to toxic residue that is left behind as a by-product of poor digestion)⁴

Various Lehana formulations mentioned by acharyas:

1. *Acharya Charaka* - *Panchgavya ghrita*⁵ (*Ghrita* means

clarified butter made from cow's milk), *Brahmi ghrita*⁶ etc.

2. Acharya Sushruta - has described 4 recipes (containing gold) which provide general immunity, body resistance, helpful in enhancing the growth & development and enhancing the intellectual power. These are: 1) *Svaranbhasm* with *Kustha* (*Saussurealappa*), *Vacha* (*Acorus calamus*), *Madhu* (honey) & *Ghrita*. 2) *Svaranbhasm* with paste of *Brahmi* (*Bacopa monnieri*) *Sankhpuspi* (*Convolvulus pluricaulis*), with, honey & *ghrita*. 3) *Svaranbhasm*, *Arkpushpi*, *Vacha*, honey & *ghrita*. 4) *Svaranbhasm*, *Khaidarya*, *SwetaDurva*, *ghrita*⁷.

3. Acharya Vagbhata - *Sarshvata ghrita*⁸, combination of *Vacha* and *Suvarna Bhasma* with honey and *ghrita*,⁹ etc.

4. Acharya Kashyapa - *Suvarna Prashana* - Pure gold (in small quantity) is rubbed in water on a clean stone & given with honey and *ghrita*, to the new-born result in promote health, growth, complexion & strength (immunity), *Panchgavyaghrita*, *Brahmighrita*, *Abhayaghrita*, *Samvardhana ghrita*¹⁰ Effective in children with delayed milestones.

BENEFITS OF LEHANA KARMA:

1. The likeable are usually in the *leha* form. Usually the *lehas* are palatable and easy for consumption. The smaller kids will always have difficulties and reluctant in taking the medicine in the tablet, *Chorna*, or *Kwatha* form. Incomparable to this *Lehana* form with added *Madura* drugs easy to administer.
2. Further the *Lehana* maybe Routine procedure or the method by which the body supplements are introduced. As we know that growing child require the extra caloric food as it is busy with playing other activities throughout. In the meantime, the rate of growth and development is very faster in the first few years of life. To meet the demands of the body in toddler there is need of some extra amount of the fats, amino acids and the carbohydrates which is supplied by *Lehana Dravya*
3. The *Medhaya Rasayans* are explained with special reference in *Lehana*, may be because growth of the brain and the nervous system is very rapid in the first few years of the life which slows down afterwards as evidenced by the Head circumference. As per modern science Brain development occurs shortly after conception and progresses at a very rapid pace in the first few years of life, where neurons form new connections at the astounding rate of 700-1000 per second¹¹.
4. As we know that nutritious disorders are quite common in the child hood period due to many reasons like poorly found of food, lack of the breast milk, vitiated breast milk etc. There may be vitamin, micro and macro elemental deficiencies which may be corrected by the daily usage of the *Lehana*
5. *Acharya Kashyapa* told that the *Lehana* is responsible for the happiness and sorrow in the future of the baby. By keeping this verse in mind, we can say *Lehana* is essential in once life time¹².

Suvarnaprashana

In *Ayurvedic* system of medicine *Suvarnaprashana* is one of the sixteen *Samskara* (rituals) described in ancient Indian scriptures. '*Suvarnaprashana*' is a mixture of micro fine particles of Gold and calcined gold particles (*Suvarna bhasthma*), *Ayurvedic* herbs, cow ghee and honey administered at a specific time i.e., *Pushya-Nakshatra*. *Suvarna* has the properties like that of *Medhavaradhanam*, *Agni vardhanam*, *Balavaradhanam*, *Vrushya*, *Ayushyakara*, *Grahapaham*, etc. these properties of *Suvarna* can be made use to strengthen an individual. Gold enhances memory power and immunity too. Oxide form of *Swarna* i.e. *Suvarna Bhasma* is easily absorbable. *Ghrita* increase mental ability and it enhance the

function of drug added with it. Adding *Madhu* in *Suvarna Prashana* is that when *Madhu* is administered in low dose to new-born, child grows gradually itself develop resistance for allergens and it remains unaffected by allergic disorders¹³. In a pharmaco-clinical study on neonates *Madhu-Ghrita-Suvarna* combination showed a significant effect of humoral anti-body formation and it acted on immunological system, which was evident by triggering the response of immunological system by a rise in the total proteins and serum IgG levels¹⁴

Rasayana therapy

Rasayana therapy - It promotes and rejuvenate the physiology of body, produce resistance against disease both physically and mentally. *Rasayana* is made up of two words: *Rasa* and *Ayana*. *Rasa* primarily means essential seven vital tissues (*Saptadhatu* e.g. *Rasa*, *Rakta*, *Mansa*, *Meda*, *Asthi*, *Majja* and *Shukra*). *Ayana* means the path or channel. So, *Rasayanas* are those that bring about proper uptake, growth and improvement of essential *Saptadhatu*s (seven vital tissues). According to *Acharya Charaka*, use of *Rasayanas* results in *Dirghamaayu* (disease-free long life), *Smiriti* (recapitulating power), *Medha*, *Aarogyam* (healthy wellbeing), *Tarunvaya* (youthfulness), *Prabha*, *Varna* (complexion), voice, strength etc¹⁵. According to *Acharya Sarangdhara*, various drugs, diet and regimens which promote longevity by delaying aging (*Jaranashanam*) and preventing diseases (*Vyadhinashnum*) are called *Rasayana*¹⁶.

Rasayana is a specialised treatment influencing the fundamental aspects of the organs i.e. *Dhatu*s, *Agni* and *Srotamsi*, leading to overall improvement in the organism, which affords prevention of ageing, resistance against diseases, bodily strength and improvement in mental faculties.

The mode of action of Rasayana Dravyascan

- By improving the nutritional value of the *Rasa Dhatu* (*Asthayee*), in turn by improving the *Dhatu Poshana* (*Dhatuvardhak*)
- By improving the *Agni Vyapara* (*Agnivardhak*) in the body, there by responsible for proper *Dhatu nirmana* in the body.
- By *Shrota Shodhana* in the body, this improves *Dhatu Poshana Kriya*.

Role of some Drugs as Immunomodulators in the present era.

Piper longum

Alcoholic extract of the fruits of the plant *Piper longum* and its component piperine was studied for their immunomodulatory and antitumor activity. Bone marrow cellularity and alpha-esterase positive cells were also increased by the administration of *Piper longum* extract and piperine¹⁷. Immunomodulatory activity of *Piper longum*, *Piperine* may be due to the combined action of humoral and cell mediated immune responses. One of the major objective of the immunotherapy is to modulate immune responses for selected objectives. It includes augmentation of cell mediated immunity and cytotoxic effect. *Piper longum* and piperine also stimulate the stem cell proliferation and differentiation¹⁸. While it is known to act as an anti-mutagenic and anti-tumour agent, anti-diarrheic and anti-dysenteric properties of this spice enhance its medicinal value. The pharmacological properties of this plant also include anti-oxidant, anti-inflammatory, hepatoprotective, immunomodulatory, anti-microbial, anti-platelet, anti-hyperlipidaemic, analgesic, anti-depressant, anti-amoebic, anti-obesity, radioprotective, cardioprotective and anti-fungal effect¹⁹. Clinical studies have revealed the efficacy of this plant in the treatment of bronchial asthma in children²⁰.

Glycyrrhizaglabra

Potential uses of *Glycyrrhiza glabra* for antitumor, antimicro

obial, antiviral, anti-inflammatory, immunoregulatory and several other activities that contribute to the recovery and protection of the nervous, alimentary, respiratory, endocrine, and cardiovascular systems²¹. Glycyrrhizin, a triterpene glycoside from root of *Glycyrrhiza glabra*, has positive effects on inhibition of hepatic apoptosis and necrosis by suppression of TNF- α and caspase-3, an important cytokine²². Recently, researchers have demonstrated the antibacterial activity of root and leaf extract of *Glycyrrhiza glabra* against *E. coli*, *Pseudomonas aeruginosa*, *Enterobacter cloacae* and *Klebsiella* sp. using well and disc method showing that both extracts were ineffective against *Enterobacter cloacae* and *Klebsiella* sp. while strong antibacterial activity against *E. coli* and *Pseudomonas aeruginosa*. Therefore, *Glycyrrhiza glabra* might be useful in the treatment of diarrhoea caused by rotavirus infection²³. High phenolic content compounds present in *Glycyrrhiza glabra* Linn. is responsible for its strong antioxidant activity due to free radical scavenging²⁴.

Emblica officinalis

Ellagic acid, as a powerful antioxidant present in *Emblica officinalis* has the ability to inhibit mutation in gene and repair the chromosomal abnormality²⁵. It has potent free radical-scavenging agents, immunomodulating and cyto-protective effect. Immunomodulatory activity by humoral antibody formation and establishment of cell-mediated immunity. Different biological activities of *Emblica officinalis* include antioxidant, immunomodulatory, anticancer, cytoprotective, analgesic, antimicrobial, antipyretic, antitussive and hepatoprotective effect. Majorities of the diseases are chiefly due to the imbalance between pro-oxidant and anti-oxidant homeostatic phenomenon in the body, and the *Emblica officinalis* balances this because of its antioxidant activity. It also reduces the side effects of chemotherapy and radiotherapy²⁶.

Curcuma longa

Dietary curcumin enhances IgG levels. Curcuminoids are considered as key active constituents of *Curcuma longa* and are reported to possess several biological activities. Numerous lines of evidence suggested, that curcuminoids are potent anti-inflammatory agents working through multiple mechanisms viz., suppression of the activation of nuclear factor (NF)- κ B, inhibition of cyclooxygenase (COX)-2, down-regulation of the expression of cell proliferation, anti-apoptotic, and metastatic gene products²⁷. Curcuminoids have also been demonstrated to modulate the proliferation and cellular response of various immune cell types, such as T cells, B cells, macrophages, neutrophils, natural killer NK cells and dendritic cells²⁸.

Asparagus Racemosus

Asparagus Racemosus is a well-known *Ayurvedic Rasayana* which prevents ageing, increase longevity, impart immunity, improve mental function, Vigour and add vitality to the body and it is also used in nervous disorders, dyspepsia, tumours, inflammation, neuropathy, hepatopathy. Reports indicate that the pharmacological activities of *Asparagus. racemosus* root extract include antiulcer, antioxidant, and antidiarrheal, antidiabetic and immunomodulatory activities. Root of *A. racemosus* has been referred as bitter-sweet, emollient, cooling, nervine tonic, constipating, galactagogue, and aphrodisiac, diuretic, rejuvenating, carminative, stomachic, antiseptic and as tonic. Beneficial effects of the root of *Asparagus. racemosus* are suggested in nervous disorders, dyspepsia, diarrhoea, dysentery, tumours, inflammations, neuropathy, hepatopathy, cough, bronchitis, hyperacidity and certain infectious diseases²⁹.

DISCUSSION

Though National Immunization Schedule is implemented

mortality rate in India is still high. From the first day of life vaccination schedule is started but all these vaccines are not able to protect the child from the diseases like major bacterial infections, viral infections and primary-secondary immunodeficiency syndromes etc. The vaccine takes almost, few months for activation of immune system and to produce the specific immunoglobulins against that specific antigen. Recent immunization data shows that vaccinations and immunization schedules are not sufficient to control the diseases. So, these are some of the major lacunas in the management given by contemporary sciences, hence it is the need of the society for an immunomodulatory agent which boost up the immune mechanism of the body. Theory of vaccination resembles to the concepts of *Vyadhikshamta*. The *Rasayana*, *lehana* and *Swarnaprashana* drugs are supposed to increase all the *Sharira Dhatu*, both qualitatively and quantitatively. These drugs also improve the quality of *Rasadhatu* and by this the entire status of the body. It is an approach towards positive health care programme for children by increasing the *Vyadhikshamta* (immunomodulation). As *Acharya* describes *Vyadhikshamta* as "The individual's resistance to disease which includes both the capacity of attenuation of the manifested disease as well as the prevention of the un-manifested one."

CONCLUSION

Children are more vulnerable to infection because their immune system is less or under developed. Immune system continues to develop as the infant grows. In this period attempt should be done for prevention of disease and to enhance physical, mental and social wellbeing of children so that each child may achieve the maximum genetic potential with which she/he is born. *Ayurveda* can augment the recovery of children suffering from high morbidity features with its *Rasayana* therapy, *lehana karma* and *Suvarna prashan*. We can say that the children should be supported externally to prevent the infections and at the same time measures should be taken for the proper development of immune system.

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