

EXPLORING THE ETIOLOGICAL FACTORS RESPONSIBLE FOR IMMUNO DEFICIENCY IN CHILDREN – AN AYURVEDIC PERSPECTIVE

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Abstract :

Immunodeficiency is the failure of immune system, which normally plays a protective role against infections, manifests by occurrence of repeated infections in an individual. It is of two types primary (Congenital) and secondary (or acquired) immunodeficiency.¹ Immunity in Ayurveda is known by the word Vyadikshamathva². Bala (Strength) and Ojas (Essence of all Dhatus [tissue elements]) are used as synonyms for Vyadhikshamatava (Immunity) and Vyadhikshamatava depends on the maintenance of equilibrium state of Dhatus. It is mentioned that Bala, Arogya (Health), Ayu (Longevity) and Prana (Vital breath) are dependent on the state of Agni (Digestive Power), that burns when fed by the fuel of food and dwindles when deprived of them³ i.e Malnutrition which leads to DhātuKshaya (Tissue Depletion) results in decrease in Ojas which can be called as Immunodeficiency. Likewise Bala (Immunity/Strength) depends on BalavatPurushe (Birth from naturally strong parents), BalvatDesheJanma (Birth in a geographical region where people are naturally strong), BalavatPurushe Kale (Birth at a time when people naturally gain strength) etc⁴. Imbalance in any one of these above mentioned factors can lead to immunodeficiency. Intake of DushtStanyacan be a cause of low immunity in infants. The present review critically examines the available literatures to evaluate the concepts of etiological factors responsible for low immunity (Immunodeficiency) in children.

Key Words : *Vyadhikshamatava, Immunodeficiency, Bala, Ojas, immunity*

Introduction :

The resistance exhibited by the host towards injury caused by micro-organisms and other products is termed as immunity⁵. Immunity in *Ayurveda* is known by the word *Vyadikshamathva*. The term *Vyadhikshamathva* is formed by two words *Vyadhi* and *Kshamathva*, where *Vyadhi* means disease and *Kshamathva* is resistance; so it is the capacity of

the body to resist the development of disease. The main purpose and objective of *Ayurveda* is *SwasthasyaSyasthyaRakshanam*, *AaturashchaVikar Prashamanam*⁶ means preservation of health in healthy person and treating ailments with breaking causative factors of pathogenesis; and to achieve this *Vyadhikshamatava* plays an important role. *Chakrapani* described immunity in two ways that is *VyadhiBalaViroditav* means which attenuate the manifested disease and *VyadhiUtpadakaPradibandhakatvam* which means to prevent the manifestation of disease.⁷ The immune system is formed from several different types of white blood cells. Usually, many different white blood cells work together to fight all types of infections. Thus the immune system is truly a system, and problem in any part can cause minor infections to become serious ones.

Aims:

To unveil the etiological factors responsible for low immunity in children.

Objectives:

1. To unveil the *Aaharaj*, *Viharaj* and *ManasHetu* for low immunity in children.
2. To unveil the *BeejaDosha* responsible for low immunity in children.

Materials and Methods:

Available *Ayurveda* texts like *CharakSamhita*, *SushrutaSamhita*, *Ashtang* etc., all available modern books, reviewed research articles, research papers, authenticated internet sources.

SharirBhava* Involved in *Vyadhikshamathva

Equilibrium state of *Doshas* (three i.e. *Vata*, *Pitta* and *Kapha* Biological humours), *Dhatu*, *Mala* (Waste matter) and *Agni* are considered as healthy state of an individual. Vitiating state of these body elements are considered as *Vyadhi* (Disease). *Doshas* get vitiated by external and internal factors and this abnormal functioning of *Dosha* is the root cause of *Vyadhi*. When these vitiated *Dosha* enters to a particular *Dhatu*, causes symptoms related to that particular *Dhatu*. Similarly elimination of *Mala* in effective way is important for state of health. Likewise *Agni* (Digestive power) is involved in every function in the body and imbalance in the physiology of *Agni* is the main cause for development of many diseases. As mentioned by *AcharayaCharak* when a woman gets indulged in *Dosha* aggravating factors, it results in spread of *Dosha* in her body. When they reach *Shonita* (*Ovum*) and *Garbhashaya* (Uterus including fallopian tubes) and when these *Doshas* do not cause complete vitiation of *Shonita* and *Garbhashaya*, then abnormality of one or more organs occurs due to maternally derived organs of that *Garbha* (Foetus). Whatever the *Beeja* (Sperm) or *Beejabhaga* (Chromosome) and *Beejabhagavayava* (Gene) gets vitiated, corresponding organ gets abnormality. These all factors are considered to be involved in the maintenance of *Vyadhikshamathva*. The role of Individual *SharirBhava* will be discussed further.

Role of Doshasin Vyadhikshamathva

Doshas in their normal and undisturbed state are the reason for *SharirBala*, but out of these three *Doshas*, *Kapha* in particular has effect in maintaining the *SharirBala*(Strength). It is mentioned by *Charak* that *Kapha* in its equilibrium state, itself acts as *Bala*, that is why normal *Kapha* is called *Ojas* (Essence of *RasadhiDhatu*) and when this *Kapha* became vitiated then it takes the form of *Mala* (Excreta) and causes diseases.⁸ *Soma*, the moon is represented by *Kapha* in our body which in its normal and abnormal state performs good or bad activities in our body, such as firmness or sturdiness of the body and looseness of body, nourishment and emaciation, potency and impotency, wisdom and ignorance and similar pair of qualities.⁹

Role of Dhatusin Vyadhikshamathva

Ojas is the essence of *RasadhiDhatu* and is formed after the *Shukra* and this *Ojas* is called as *Bala*.¹⁰ *Ojas* having all the essential ingredients and essence of all the tissues embedded in it represents the gross immunity of a person. If all the *Dhatu*s are balanced in terms of quality, the *Ojas* too are going to be formed and balanced in a great way.

Importance of Ojas in maintaining Vyadhikshamathva :

Ojas is the essence of *RasadhiDhatu* and it is also called *Bala*¹⁰ and this *Bala* can destroy the strength of the *Doshas* and promotes the strength of body¹¹ hence this *Ojas* has the property to prevent and eliminates diseases from the body. It is the *Ojas* which keeps all living beings nourished and refreshed. There can be no life without *Ojas*.

Ojadosa (Abnormalities in Ojas) is of 3 types¹²:

1. OjoVisramsa (Displacement from its normal place)

Clinical features of *OjoVisramsa*:

- *SandhiVishlesha* (Looseness of the joints)
- *GatraSada* (Weakness of the body)
- *DoshaChyavana* (Displacement of *Doshas* from their respective seats)
- *KriyaSannirodha* (Impairment in activities)

2. OjoVyapat (Ojas get vitiated by DustaDosha and Dushya)

Clinical features of *OjoVyapat* :

- *SthabdaGurugatrata* (Stiffness and heaviness in body)
- *Vatashopha* (Edema because of increase of *VataDosha*)
- *Varna Bheda* (Skin discolouration)
- *Glani* (Fatigue)
- *Tandra* (Improper functioning of sense organs)
- *Nidra* (Excessive sleepiness)

3. OjoKshaya (Decrease in its quantity)

Clinical features of *OjoKshaya*:

- *Murcha* (Fainting)

- *MamsaKshaya* (Lack of muscle mass)
- *Moha* (Delusion)
- *Pralapa*(Delirium)
- *Marana* (Death)

***ShariraBalaVruddhikaraBhava*(Factors responsible for promotion of strength)⁴**

BalaVruddhikaraBhava has importance to improve *Bala* logically from the birth. *SharirBala* is the strength of an individual to do any work and prevent manifestation of disease. To achieve this Charak explained *BalaVruddhikaraBhava* as follows:

1. *BalavatPurushe*(Birth from naturally strong parents)
2. *BalvatDesheJanma* (Birth in a geographical region where people are naturally strong)
3. *BalavatPurushe Kale* (Birth at a time when people naturally gain strength),
4. *SukhashchaKalayoga*(Pleasant and moderate climate)
5. *BeejaKshetragnasampacca* (Excellence of *Beeja*[Sperm and ovum] and *Kshetra* [Uterus])
6. *AharaSampacca* (Excellence of Food)
7. *ShariraSampacca*(Excellence of Physique)
8. *SatmyaSampacca* (Excellence of Adaptability to various factors responsible for maintenance of the body)
9. *SattvaSampacca* (Excellence of mind qualities),
10. *SvabhavaSamsiddhi* (Natural Tendency),
11. *Yauvanam* (Young Age),
12. *Karma* (Exercise)
13. *Samharsh* (Cheerful nature)⁴.

Immunodeficiency¹³

Immunodeficiency is that failure of immune system, which normally plays a protective role against infections, manifests by occurrence of repeated infections in a person.

Immunodeficiency disease are classified into 2 groups :

1. **Primary (or Congenital) immunodeficiency diseases** are the result of genetic or developmental abnormality of the immune system.

Classification of primary immunodeficiency diseases :

Humoral immunodeficiency (B cell defects)

- Bruton disease (X-linked agammaglobulinemia)
- Common variable immunodeficiency
- Isolated IgA deficiency
- Hyper IgM syndrome

Cellular immunodeficiencies (T cell defects)

- DiGeorge syndrome (thymic hypoplasia)
- Chronic mucocutaneous candidiasis
- Purine nucleoside phosphorylase deficiency

Common immunodeficiencies (B and T cell defects)

- **Severe combined immunodeficiencies**
Cytokine receptor mutation
Adenosine deaminase deficiency
- Wiskott-Aldrich syndrome
- Ataxia telangiectasia
- Nezelof syndrome

Disorders of phagocytosis

- Chronic granulomatous disease
- Myeloperoxidase deficiency
- Chediak adhesion deficiency
- Leukocyte adhesion deficiency
- Lazy leukocyte syndrome
- Job's syndrome or Hyper IgM syndrome

Disorders of complement

- Complement component deficiencies
- Complement regulatory protein deficiencies

2. **Secondary immunodeficiency**, also known as acquired immunodeficiencies are due to the secondary effects of other diseases, such as:
 - Malnutrition (due to inadequate immunoglobulin synthesis)
 - Aging (suppression of immune system with age)
 - Patient with several infections that suppress immune system causing lymphocyte depletion, e.g. HIV infection.
 - Underlying cancers (particularly those of the bone marrow and blood cells).
 - Underlying proteinuric renal diseases – leads to loss of immunoglobulins.
 - Sarcoidosis
 - Patients on immunosuppressive medications.
 - Patients receiving chemotherapy or radiation therapy for malignancy.

Factors Responsible For Low Immunity In Children

Ahara (Food) and Svapna(Sound Sleep)

There are three *Upastambha*(supporting pillars) which supports life i.e *Ahara*, *Svapna* and *Brahmacarya* (control over senses). By this body will be endowed with strength,

complexion, growth and live longer.¹⁴ Out of these three factors *Ahara* and *Svapna* plays an important role in development of immunity in children. It is clearly mentioned in *Charak Samhita* that the food taken in right quantity certainly provides strength, complexion, happiness and longevity to the person, without disturbing the normalcy.¹⁵ In infants and young children inadequate breast feeding and *Dusht Stanya* are the major cause of undernutrition and malnutrition. The child who feeds on the milk of abnormal taste suffered by the vata, becomes very weak. The child does not enjoy the taste of milk and thus his growth gets impaired.¹⁶ Consuming the frothy milk, the child's voice becomes feeble. His stool, urine and flatus are retained and he suffers from *Shiroroga* due to *Vata* and *Pinasa* (Chronic Coryza) and this *Vata* vitiated milk causes the decrease in *Bala* (Strength).¹⁷ If child takes *Pitta* vitiated milk he suffers from *Pandu* (Anaemia) and *Kamala* (Jaundice)¹⁸ If a child takes the milk vitiated with *Kapha*, this *Atisnigdha* (too unctuous) milk cause vomiting, gripping pain and excessive salivation. The child suffers from sleep, exhaustion, breathlessness, cough, excessive dribbling of saliva and due to *Picchil Guna* (Slimy) it cause swelling of face and dull eyes and by *Gurutav* (Heaviness) child suffers from heart disease.¹⁹

In Protein and Energy Malnutrition (PEM) cell mediated immunity is impaired, common infections and opportunistic infections can lead to increased morbidity and mortality.²⁰

Similarly *Nidra* (Sound sleep) has an impact on the immunity of body. As wholesome diet is important for the upkeep of the body, sleep is important for happiness. Therefore, obesity and leanness are specifically caused by improper sleep and diet.²¹ In human beings, happiness and misery, nourishment, emaciation, strength and weakness, fertility and infertility, knowledge and ignorance, life and death depend upon proper and improper sleep. Proper sleep brings about happiness and longevity in human beings.²²

Role of Agnimandya in Immunodeficiency:

If in any child there is *Agnimandya* (Malfunctioning of digestive fire) initial *Aahara Rasa* remains undigested and this *Agni Dushti Janya Aam Rasa* remain in *Amashya* (Stomach) is known as *Aam*²³ (Toxins from undigested food). This leads to contamination of *Rasa Dhatu* with *Aam* and subsequent weakening of *Rasa Dhatva Agni* and disturbed metabolism within the *Rasa Dhatu*. *Rasa* contaminated with the *Aam* tends to block the channels of body, due to this body will be deprived of nutrition. Due to obstructive pathologies like *sanga* etc the subsequent *Dhatu*s are not get proper nourishment and ultimately impairs the immune system and leads to cause different kinds of disease related with that particular *Dhatu*. Immunodeficiency is that failure of immune system, which normally plays a protective role against infections, manifests by occurrence of repeated infections in a person.

Effect of Saririka Prakrti (Body Constitution) on Immunity

Seven types of *Saririka Prakrti* has been described namely *Kaphaja*, *Pittaja*, *Vataja*, *Vata Kaphaja*, *Kapha Pittaja* and *Sannipataja Prakrti*.²⁴ *Sama Prakrti* persons possess all excellent qualities of all *Dhatu*s.²⁵ *Kaphaja* persons are strong²⁵ While *Pittaja* predominant persons are of moderate *Bala*²⁶ and the persons having predominance

of *Vata* have low degree of strength²⁷ so a child born with *Vataja Prakriti* may have low immunity as compared to other *Prakriti* children.

***Beeja Dosh*(Genetic Defect)**

*Sahaja Bala*²⁸ which is the natural capacity of body to resist and withstand diseases that one acquires right from birth and depends upon the healthy condition of sperm and ovum of parents and proper intake of balanced food by anticipating mother during pregnancy and any fault in these factors may lead to *Beeja Dosh* & result in defective *Sahaja Bala* called decreased innate immunity which can be a cause of diseased condition.

Effect of *Kala* (Season) on Immunity

Kalaja Bala is explained in *Ayurveda*. *Kala* (Season) are divided into two sectors i.e *Adana Kala* and *Visarga Kala*. *Adana Kala* includes *Shishira Ritu* (Late Winter Season), *Vasant Ritu* (Spring Season) and *Grishma Ritu* (Summer Season) and there will be a reduction of body strength naturally during *Adana Kala* while *Visarga Kala* includes *Varsha Ritu* (Rainy Season), *Sharad Ritu* (Autumn Season) and *Hemant Ritu* (Rutu Season); these seasons give natural strength to the human beings. So the birth in the *Visargakala* will give better immunity as compared to the *Adana Kala*.

***Stanya*(Breast Feeding) and the Immune Response**

Breast feeding provides unsurpassed natural nutrition to the newborn and infant. It has been further suggested that breastfeeding facilitates increased immunologic tolerance, and may thus decrease future risk of autoimmune disorder.²⁹ Human breast milk also contains numerous protective factors which include immunoglobulin mainly secretory IgA, macrophages, lymphocytes etc. Breast feed babies are less likely to develop infections. Breast feed babies have a lower risk of allergy, ear infection and orthodontic problems and have a lower risk of diabetes, heart disease and lymphoma in later life.³⁰

***Aushdhi*(Medication) During Pregnancy**

Aushdhi like Antibiotic use during pregnancy can increase a child's risk of being hospitalised with infection by almost 20 per cent. This was most likely the result of a mother being prescribed antibiotics during pregnancy that then impacted on both her and her baby's microbiomes.³¹

***Paryavaranjanya* (Environmental) Toxins**

There are numerous other chemicals to which we are exposed in our daily life. For most, studies to examine whether they adversely impact the developing immune system or alter susceptibility to infectious disease have not been conducted. Likewise, for several of those chemicals, we do not yet fully understand their mechanism of action as toxicants. Despite these gaps in knowledge, it is increasingly recognized that formative years exposures can

have a profound impact on the developing immune system, and will thereby contribute to disease later in life.³²

Conclusion:

In *AyurvedaVyadhikshamathva* interlinked with tissue nourishment, *Ojas* formation as the biological determinant of immune strength in an individual. Hence *Ayurveda* advocates for better nutrition, richer *Ojas* system, stronger *Agni* and competent microcirculation so as to possess good immune strength. *Ayurveda* considers *Prakrti* i.e hereditary and genetic predisposition and *Apathya* being the principal causes of illness. The modern understanding of immunity fits within the broad concept of *Vyadhikshamatva* in *Ayurveda*. According to *Charaka*, not all human beings are equally capable of *Vyadhikshamatva*.³³ This is due to the different nutritional status of the individuals and constitutional status or *Prakrti* also differs from individual to individual and thus the *Vyadhikshamatva*. Breastfeeding is well known to provide immune protection and prevent various diseases in the perinatal period. There are various literature for evidence of long-term benefits of breastfeeding that may influence autoimmunity. There are also other factors like antibiotics during pregnancy and environmental pollutants which may have adverse effect on immunity of children.

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