

AYURVEDIC CONCEPT OF IMMUNITY: A REVIEW

Dr. Asha Bhardwaj*¹, Dr. Nikhila Ranjan Nayak², Dr. Chandrasherikhar Ghatge³ and Dr. Shraddha⁴^{1,4}PG Scholar, Department of Roga Nidan Evum Vikriti Vigyan, Shri N.P.A. Govt. Ayurved College, Raipur Chhattisgarh India.²Prof. & H.O.D., Department of Roga Nidan Evum Vikriti Vigyan, Shri N.P.A. Govt. Ayurved College, Raipur Chhattisgarh India.³Reader & H.O.D., Department of Prasuti Tantra Evum Stree Roga Vibhag, Shri N.P.A. Govt. Ayurved College, Raipur Chhattisgarh India.***Corresponding Author: Dr. Asha Bhardwaj**

PG Scholar, Department of Roga Nidan Evum Vikriti Vigyan, Shri N.P.A. Govt. Ayurved College, Raipur Chhattisgarh India.

Article Received on 09/08/2019

Article Revised on 30/08/2019

Article Accepted on 20/09/2019

ABSTRACT

Ayurveda is the science of human health and disease. It deals with comfort, discomfort, physiological and pathological aspect of life. The word immunity means the strength of protecting from infectious diseases. The immune system evolved as defense system to protect body from invading pathological microorganisms and malignant diseases. Strong immunity is the key for maintaining stability in health with the changing season. *Vyadhikshamatva* is described in *Ayurveda* and this concept is considered equivalent to immunity. Normal condition of *kapha*, *Bala* and *ojas* are also similar to immunity. *Vyadhikshamatva* literally means resistance (*ksamatva*) against disease (*vyadhi*). Physical and mental resistance to disease is of enormous significance for all living being, it regulates both prevention against and rapid recovery from diseases. *Ojas* is final and excellence of the product *dhatu* and *vyadhikshamatva* depends on it. Innate immunity may be correlated to *sahaja bala* and *kalaja bala* may be correlated to acquired immunity. Here is a review of Ayurvedic texts regarding immunity and concept of *Vyadhikshamatva* which depends on normal *dosa*, equilibrium state of *dhatu*, normal *agni bala* and *ojas* etc.

KEYWORDS: *Ayurveda*, Immunity, *Vyadhikshamatva*, *ojas*, *Bala*.**INTRODUCTION**

Many people are prone to disease due to their faulty dietary habits, change in climate, on the other hand, some people remain healthy in spite of breaking dietary rules or changes in climate and they do not get affected by many diseases. Many microorganisms enter the human body through air, water, soil but fail to produce disease due to immune response present in the living body. The most important thing in relation to health and disease is immunity of the body.

Immunity is defined as the capacity of the body to resist pathogenic agents. It is the ability of body to resist the entry of different types of foreign bodies like bacteria, virus, toxic substances etc. Immunity is of two types 1. Innate immunity 2. Acquired immunity, Innate immunity is the inborn capacity of the body to resist pathogens. Acquired immunity is the resistance developed in the body against any specific pathogens after an antigenic stimulus. So this type of immunity is also known as specific immunity.^[1]

Our immune system is essential for our survival. Without an immune system our bodies would be open to attack from infections. It is our immune system that provides us

protection against pathogens. *Vyadhikshamatva* is described in *Ayurveda* and this concept is considered equivalent to immunity. In *Ayurveda* innate immunity may be correlated to *Sahaja bala* and acquired immunity may be correlated to *kalaja* and *yuktikrita bala*. Keen observation substantiates that human being has two different varieties of strengths. 1. The strength required for the growth of the body and to perform routine activities is called ENERGY (*Shakti*) 2. The Strength required to protect the body against several disease is called RESISTENCE (*Kshamatva*).^[2] In *Ayurveda*, *Ojas* has been described as vital defense mechanism of the body. *Ojas* is final *dhatu* and *vyadhikshamatva* depends on it.

MATERIAL AND METHOD

This article is based on a review of *Ayurvedic* texts. Concept of *Vyadhikshamatva* described in various ancient *samhitas*, text book, internet and research papers will be analyzed thoroughly.

CONCEPT OF HITA AND AHITA FOOD SUBSTANCE

Some food substance are wholesome and suitable for the body as the body can inheritably transform those

substances into its own (congruent) by virtue of *jatisatmya*, called *hita* substances (*satmya*). Substances which are always suitable and accustomed (to man) by birth like water, ghee, milk, porridge (boiled rice) etc are called *hita* substance while others those which are always unsuitable and causes putrefaction and similarly death (destroying) such as fire, caustic alkali, poison etc. so also some others which by combinations become similar to poison, are called *Ahita* substance (*Asatmya*).^[3]

The following three are the reasons seen for the ill-effect being present in *ahita* substances

1. Natural inheritance feature (*nisargadapi*)
2. Physical or chemical combinations (*nithogunanam*)
3. Refinement (*samskara*)

Some other example of *ahita dravyas*

1. Incompatible combination and incongruent exposures (*viruddha ahara viharas*)
2. *Vajra* told by *Kasyapa* means incongruent substance to produce antigens due to improper digestion eg; insect, creatures, grass etc.
3. Certain drugs (medicine).
4. Micro-organisms (*grasas*).
5. Psychological aversion.
6. The *viruddha dravyas* e.g. equal quantities of honey and *ghee*.

All the causes are responsible for disease production. Hence *vagbhata* advised that all drugs in the practice of medicine should only be used logically. Not only *ahita* diets and medicines provoke the hostile reactions but ones *viruddha* deeds (*vihar*) also manifest such mishap ex; sudden cold water bath after heat exhaustion is injurious to eye & skin and promotes thirst.^[4]

CONCEPT OF SHAKTI

It can be classified as below:

1. That requires for body growth and to perform the routine activities (energy).
2. That requires to protect the body against disease (resistance).

BALAM- The improvement of the former may improve the latter and vice versa too. But at the same time these two may remain absolutely different.

The word *bala*, *pusti*, *dardhya* are seen mostly used with reference to ENERGY whereas the word *OJAS* and *KSAMATVA* are mostly refer to RESISTANCE. The word *bala* and *ojas* sometimes are seen used referring to both concept.

KSAMATVA

Hitakar substance lies in the body by way of *Jatisatmya*. The substance which lies in the body by way of permanent addiction is called *Satmya*. *Ahita* substances by being incongruent exert a hostile response by exciting the *doshas* and are called *asatmya*. However at the time such *asatmya* substances do not harm the body but

remain dormant due to their regular and continuous usage in smaller doses. In the strong person with good virility, exercise and good digestive capacity, the said *asatmya* substances in small quantities cannot harm the body. The endurance or the capacity to withstand stress and strain of such individuals is called *KSAMATVAM*.

Chakrapani defined the same as the inherent capacity of the body either to avert the precipitation of the disease or to check its intensity to make the body withstand when afflicted by the disease. The following two aspects are concerned with such preventive capacity.

- (1) Unsuitable environment and seed sown in unsuitable land gets destroyed itself. The *prakri vighata cikitsa* in *krmiroga* is of similar concept.
- (2) *Trnikarana bhava*: It is some inhibiting factor present in the body which nullifies the attack.

The said unsuitable environment may be general (against several diseases) or specific (to a particular disease). The classical example for the latter is the *Caraka's* mention that the horse drug treatment with *vidanga* and *triphala kwatha* prevents re-accumulation of intestinal worms. This is the reason why certain individuals seldom get diseases, if not spontaneous recovery without any treatment occurs.^[5]

VYADHIKSAMATVA

During certain conditions or due to certain factors, even unwholesome food does not produce diseases immediately. All unwholesome food articles are not equally harmful, all *doshas* are not equally power full, all persons are not equally capable of resisting diseases.

Vyadhiksamatva is resistance to diseases or immunity against disease and is of two kinds i.e. the one which attenuate the manifested disease and other variety prevents the manifestation of diseases.

Unwholesome food substances become more harmful depending upon the nature of the locality, time, combination, potency and excessive quantity for example, *vrihi* type of corn is unwholesome because it aggravates *pitta*. The same become more unwholesome if consumed by marshy land (*anupadesa*) people the same become less harmful if consumed by *dhanvadesa* people.

It is more unwholesome during *sarad ritu* (autumn season) and less harmful in *hemant ritu* (winter season). If it is consumed with curd, *phanita* (penidium) become more unwholesome and the same become less harmful if consumed with honey. If consumed hot it is more unwholesome and the same if taken in cold condition become less harmful. If consumed more in quantity become more unwholesome and become less harmful if consumed less in quantity.^[6]

CONTRIBUTING FACTOR FOR VYADHIKSAMATVA

Factor which contributes for *Vyadhiksamatva* are normal *dosha*, equilibrium state of *dhatu*, normal *agni*, patency of *srotas* etc. or factor which supports the equilibrium state of all physiological parameters. These points are described below. Equilibrium state of *dhatu* is called *svastha*. *Upayogi hetu* (useful etiological factors) are those useful to the body and they indulge in protection of *dhatu*s, which is important for homeostatic condition of body and mind. Aim and object of *Ayurveda* is the maintenance of equilibrium state of tissue elements.^[7] Regular oil massage leads to strong body physique. Consumption of proper amount of food certainly helps the individual in bringing strength, complexion, happiness and longevity. An intelligent person should be vigilant about his duties towards his own body like an office in charge of a city and a charioteer towards the city and the chariot respectively. So, wise person should protect his body both externally and internally by adopting *dincarya* in daily routine. The *dosas* are exceeding painful, acute and difficult to cure during their multiple combinations, if they require mutually contradictory therapies, if they are deep seated i.e. deeper *dhatu* like *majja* etc. are involved in the pathogenesis of disease. If disease is chronic i.e. it become very difficult to cure because they are deep seated and gives displeasure and disease becomes incurable. If *dosa pranayatana* are involved in the disease process along with other vital organ like *hrdaya* etc, then disease become difficult to cure. If vital organs afflicted, then disease become difficult to cure. If disease manifest instantaneously indicates disease become very difficult to cure.^[8]

Mode of Mechanism

Chakrapani described the *vyadhiksamata* and used the following word-

1. *Vyadhiksamatva*
2. *Vyadhi balavarodhatvam*
3. *Vyadyutpadaka pratibhandhakatva*.

1. *Vyadhiksamatva* as described above, it acts as innate immunity.
2. *Vyadhi balavarodha* is developing specific immunity against the *bala* of a disease, that what we achieve by *Naimittika rasayana*. Improving strength against a specific disease that is to counter the *vyadhibala*.
3. *Vyadhiutpadaka pratibhandhaktva* which is elaborately described by *chakrapani*.

Vyadi utpatti is because of *apathya ahara vihara* etc. If you plan to counter the *vyadhi utpadaka hetu* or cause *pratibhandaka* to the apathy, the disease process will be stopped, thus there is no progress of the disease. This is nothing but a mode of *samprapti vighatana* by which the disease is put down on its own.^[9]

Vyadhiksamatva means one who is capable of resisting diseases. Depending on the nature of *vatadi doshas* and person who is not capable of resisting diseases suffers

from diseases either mild or severe, acute or chronic. Person who is desirous of health should adopt the healthy practices related to diet, conduct and activities. Equilibrium state of *dhatu* is healthy and gives rise to pleasure.

BALA

Bala means strength, strength is required to perform vigorous physical work, to resist the power and to overcome the force of disease and decay. *Bala* is purely functional, depending upon the *sama dosa, hetu* and *mala* is an inherent factor, based on *prakriti*. *Caraka* says while stating the limitations of *langhana* that '*Langhana* should be done without disturbance to *bala* because '*bala* is the base of health. It indicates that the *bala* is an inherent factor derived from *prakriti* as well as built and maintained by *sama dosa, dhatu* and *mala* condition. *Bala* is also a synonym for *kapha dosa*. *Bala* is only the power that controls the *doshas* or *rogas*. *Vagbhata* also states that *bala* is the strength that pacifies the *dosa sushruta* equated the *bala* even with *ojas*. All the positive function for preservation of health and deliver the function of *dosa, dhatu* and *mala* depends upon the *bala*. Basing on its functions *bala* can be studied in two aspects.

Vyayamsakti

Strength for performing physical activity, the strength of doing physical work depends upon *sthiropchitmsata*, well formed, compact and stable musculature. *Dalhana* further clarifies *bala* as *sarvadhatusaropachayalakshana* with growth and development of all the *dhatu*sara. It is indicating that the *bala* is the outcome of functions yielding from *sarvadhatusara* i.e. performance of acting by each *dhatu* and together is nothing but *bala*.

Vyadhiksamata

Vyadhiksamata is a power to resist and overcome the force or factors which bring about disease and decay. The word *vyadhiksamatva* is under use since *samhita* and *vedic* age, which was used to represent the natural power of resistance against a disease.

Caraka says that all the bodies are not equally capable to counter or to resist the disease and decay. Sometimes body naturally heals without help of medicine eg. 1. Wound due to trauma or a cut injury- if you protect from *dustahetu*, it naturally heals without necessity of any drug. That capability of natural healing process is called *vyadhiksamatva* which is mostly inherent and sometimes acquired. 2. By putting on '*Langhana*' in a case of *jwara* we are allowing the body to get *amapacana* itself. That disease countering capacity is *Vyadhiksamatva*. By enumerating the synonyms of *Vyadhiksamatva*, we will be knowing the multi dimensions of the *vyadhiksamatva*.

1. *Prakriti raksini*, 2. *Ksamatva*, 3. *Pratibalam*, 4. *Pratyanikabalam*, 5. *Vikaravighata bhava*.

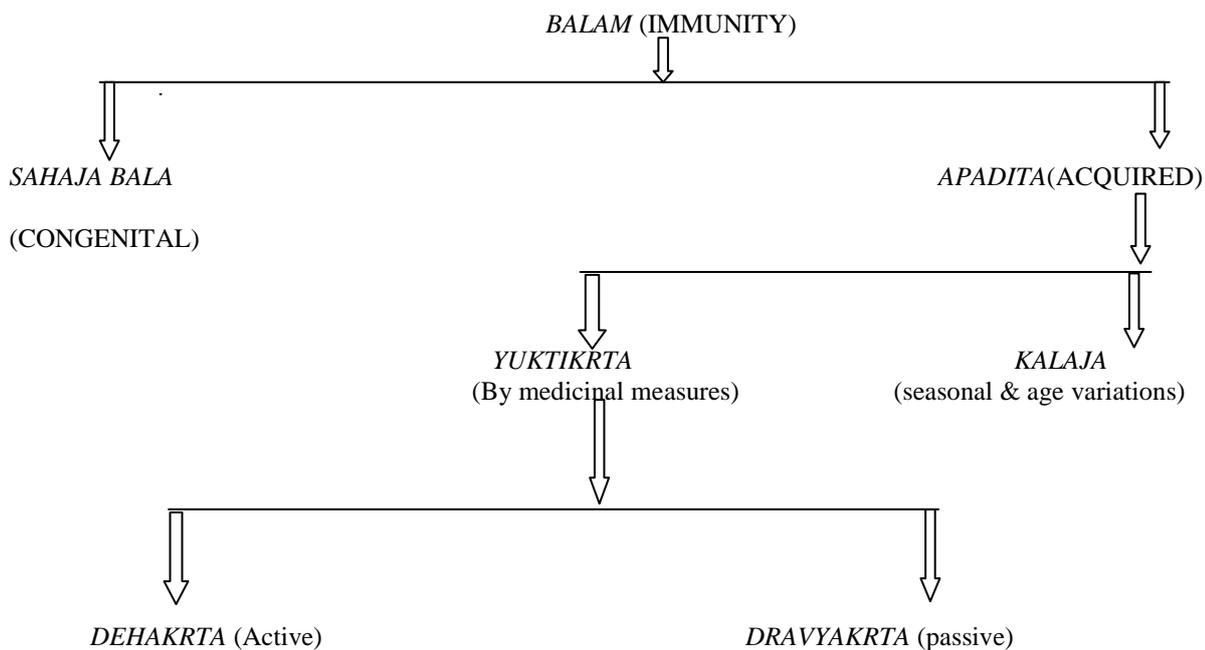
In all living bodies there is a natural protective force which is called as *prakriti raksani*. *Ksamatva* means for strength, which has capacity to control its own self from a disease. Certain people will have natural resistance against a disease. *Carak* as quoted above, all bodies doesn't possess equal capability. It varies from person to person. eg. In some person HLA molecule may be implicated in the pathogenesis. In other, the specific HLA molecule may be linked to a gene determining immune responsiveness to a particular antigen. *Pratibalam* means the strength of the body to counter the disease. If *dhatu sara* is sufficient enough, though exposed to a *abhisangaja hetu*, the disease manifestation will not take place in the body. If at all occurs, the body counters and arrests the progress of the disease. *Kapha prakrti* person may have more *pratibala* in comparison to other *prakrti*. *Pratyanika balam* means a specific immunity against a disease. Having immunity whether it is acquired or innate against a disease, is known as *pratyanika bala*, which we can say as specific immunity. *Vikara vighata bhavas* acts as speed breakers and cause obstacles in the progress of disease manifestation. After formation of *vikara* in the body, the body tries to break down the *samprapti*. The *bhavas* that produce the defense mechanism against a *vikara* are called as *vikara vighata bhava*. These are produced in the state of *dhatu samya* and in good state of *ojas*. All the phagocytes mechanisms come under this category.^[10]

STRENGTH IS OF 3 TYPES

1. *Sahaja bala* 2. *Kalaja bala* 3. *Yuktikrta*.
1. **Sahaja bala(Constitutional)** - It is an inherent characteristic property of an individual present since birth. It is because of equilibrium state of *dosas*.^[11] *Bala* or powers acquired through genetics i.e. hereditary, through parents, immunization from the mother during pregnancy are called as *sahaja bala*. *Ayurveda* mentions the disorders acquirable through *bija dosa*. The absence of those *bija dosa* disorders, are in another way enhancement of *sahaja bala*. *Chakrapani* says that inborn strength of physical activity and immunity comes under *sahaja bala*. The race, species, specific immunity is also come under *sahaja bala*.^[12] This type of *bala* or resistance to disease is stated to be *prakrta*, i.e. inherent genetics resistance existing in the individual's body since birth. This increases along with the growth of the '*sapta dathus*'. It comprehends both *sharira* and *satwa* i.e. body and mind.^[13]
2. **Kalaja bala(Temporary)**- *kalaja bala* is dependent on seasoned age as of strength is observed in *aadanakala*, gaining of strength is observed, in *visarga kala* and middle age is considered as full of strength.^[14] This type of *bala* is influenced by the factors like seasonal variations and age of the individual. *Bala* is stated to be at its high peak level in the *visagra kala*, spreading over *varsa*, *sarad* and *Hemanta rtus*, which are known as *sita* or cool period.^[15] The *bala* acquired through seasonal climatic variations usually in cold climate, the

working capacity of man increases rather than in hot and humid climates. Tiredness or fatgueness or *balabramsas* in summer (*Grismartu*) is also the effect of *kala*. *Visargakala* is the best in giving strength to the humans either to do physical works or enhance immunity. Usually the person suffers less in the *visargakala*. Apart from the season, age factor also plays vital role in combating the disease. Adolescence or adults will have more strength in comparison with other age groups.^[16]

3. **Yuktikrta bala(Acquired)** – Acquired strength is dependent on healthy practices related to diet, activities etc.^[17] This type of *bala* refers to the induction of body's resistance against disease by resort to appropriate nutrition such as meat, ghee etc. physical exercise, rest depletory, restorative and *rasayana* therapies in keeping with the seasonal requirements. Adoption of '*Swasta vitta*' principles of *Ayurveda* along with *achara rasayana* also contributes to the growth of *yukti krta bala*.^[18] The strength or activity is acquirable through the intake of *sarvarasa*, *satmya ahara*, *mamsa* and *sarpi* etc, protein diet with requirable relaxation and exercise and using the *rejunivators*. *Sarvarasa ahara* builds *samadosa*, *samadhatu* and *samamala* which maintain the homeostasis of the body there by promoting the body strength and immunity. Regular and systemic use of relaxation and physical activity naturally relieves the stress there by harmonious condition of mind. Presently studies on this topic, increasing and building the immunity by keeping the mind in harmonious condition developed much and became a branch of medicine namely pschoneuro immunity.^[19]



Ojas and immunity

Ojas is the essence of *saptadhatu* and it is the seat for strength. *Ojas* is the essence of *saptadhatu* and it is the mala of *sukra*. The term *ojas* has been stated in Ayurvedic classics to stand, not only for *sleshma* but also for *rasa* and *rakta*. It is seen in addition that a reference has been made to two kinds of *ojas* viz *ardhanjali ojas* and *astabindu ojas* by *Chakrapani*. These are important and significant in the context of *vyadhi ksamatva* interpreted both as *vyadhi bala viroditva* and *vyadhi utpatti vibandhakatva*. These two types of *ojas* have a direct bearing on body's defense against decay, degeneration and infection. *Caraka* has made a mention of *slesmika ojas*, which according to *Chakrapani* is different from *astabindu ojas*. It is transported through the *ojavaha dhamanis*. It is *ardhanjali* in quantity. Further there are two kinds of *ojas* i.e. 1. *Para*, 2. *Apara*. *Caraka* has also described *apara* in the chapter *Artha dosamahamulya*. In this context *Chakrapani* says while commenting that the quantity of *para ojas* is 8 drops (*astrabindu*) and it is located in *hrudaya*. The seat of *apara ojas* (*ardhanjali*) on the other hand is the ten *dhamanis* connected with *hrdaya*.^[20]

The Qualities of Ojas

Caraka has attributed the following qualities to *slesmika Ojas*. White, slightly reddish or yellow resembling the colour of *ghee*, sweet in taste like honey and has the smell of *laja*.^[21] According to *Sushruta Smatka* (cooling/watery) *snigdha* (viscous), *shukla* (white), *sita* (cold in potency), *sthira* (an ability to keep up the body organ in a perfect order), *sara* (permeating through), *viviktam* (best nutrition) *mrdu* (soft) *mrtsna* (slimy), *pranayatana* (seat of life) and *uttama* (best). While commenting on the functions of *ojas* *Susruta* has made a significant observation- The entire body with its limbs and organs is permeated with *ojas* and *tat abhvasca shriryanta sarirani* i.e. in the absence

or deficiency of *ojas* in the body causes wasting, decay, degeneration and destruction.^[22] The statement indicates the preservative nature of the *apara ojas* in preventing the decay of the body. *Ojas* is the *sara* i.e. essence of all *dhatu*. It is originated like honey gathered by bees from various flowers and fruits. *Ojas* is derived from all the '*Sapthadhatus*' in other word all the *dhatu* contribute to the making of it. *Ojas* is *param teja*, which is the essence of all *sapta dhatu*, being located in the *hrdaya*, combines with *rasa* and circulates through the *dhamanis* and perform the *tarpana* or *prinanam* of the entire body. Naturally *ojas* encapsulates in it all the vital function of *rasadi dhatu*, since it is their essence. The *bala* of all *dhatu* is present in the organism from the time of fertilization of the *shonita* by *shukra* due to its *swakarma* the natural power. The significance attached to *slesmika ojas*, its production and distribution viz-a-viz *kapha* and its role in the preservation, protection of the body against decay, degeneration and disease is described in the conditions by *sushrut* as; 1. *Ojas-visramsa* 2. *Ojas-vyapat* and 3. *Ojas-ksaya*.^[23]

1. **Ojas Visramsa-** *Visramsa* means displacement from its normal place. Clinical features due to *ojas visramsa* are as follow-
 - Looseness of the joints.
 - Weakness of the body.
 - Displacement of the *doshas* from their respective seats.
 - Impairment in activities or sluggish behavior.
2. **Ojas Vyapat-** *Vyapat* means *ojas* gets vitiated by *dusta dosha* and *dusya*. General symptomatology due to *ojas vyapat* are as follows-
 - Stiffness and heaviness in body.
 - Swelling due to *vata*.
 - Discolouration or loss of complexion.
 - Exhaustion

- Stupor
 - Excess sleep.
3. **Clinical features of *ojas ksaya***- Decrease in its quantity
- Fainting
 - Wasting of muscles
 - Unconsciousness
 - Delirium
 - Death

Ojas Vraddhi Laksana

Increased *ojas* is responsible for unique growth, nourishment and promotes strength. *Rajayaksama* (tuberculosis), *madhumeha* (diabetes mellitus), *Pandu roga* (anemia) these are few examples of diseases in which the power, production and distribution of *ojas* is affected. *Agantuja/adibhautika* factors like trauma, wasting diseases, fatigue, malnutrition due to *alpasana*, *visamasana*, emotional stress like anger, grief etc. obviously interfere with the production of the proper quality and in required quantity of *slesmika ojas* and its distribution to the various *dhatu*s and organs. Thus *ojas* and immunity are interlinked. If *ojas* is in physiological state, there is no possibility of development of disease processes including infections like viral/bacterial etc. since the *ojas* is the *sara* of *saptadatus* and naturally impacts profound support and preservation.^[24]

Concept of improving strength- The following factors which favors the promotion of strength.

- Births of a person in a country where people are naturally strong for example in 'Sindh' region people are strong by nature.
- Time factor which is conducive for *dhatu* and helps for promotion of strength.
- Excellency among qualities of *bija* (sperm) and *ksetra* (ovum and uterus) of parents
- Excellence of diet.
- Excellence of physique.
- Excellence of suitability.
- All mental faculties are superior
- Natural mechanism
- Young age.
- Exercise and such other physical activity promote strength.^[25]

Always cheerful mood is also helpful to gain strength. Celibacy, sleeping in a place which is devoid of breeze, hot water bath, sleeping during night, physical exercises are best adjustable to all as a wholesome substance. Strength gives stability and maintains compactness of muscles, energy to perform all kinds of activities without any hindrances, clarity in voice and complexion, both *karmendriya* and *jnanendriya* performs their normal functions. Protection of health of healthy individual is very important.^[26]

CONCLUSION

The main purpose and objectives of *Ayurveda* is the preservation of health in healthy individual and eradication of disease, which are curable. Here is a review of Ayurvedic concept of immunity which can be co-related with Ayurvedic concept of *Vyadhikshamatva* and normal condition of the *Kapha*, *bala* and *ojas*. *Ojas* is final and excellence of the product *dhatu* and *vyadhikshamatva* depends on it. Production of excellence of *dhatu* depends on the *Hita* and *Ahita Ahara* and *Agni*. Person who is having balanced proportion of muscle, compactness excellent sensory faculties never suffer from diseases. These people can easily withstand hunger, thirst, heat of the sun, cold and physical exercise. *Agni* performs normal digestion and metabolism activities. Person who is possessing excellence of all *dhatu* including mental faculties i.e. *sarva sara* are endowed with great strength, happiness and resistance to diseases. *Rasayana* therapy help in producing excellence *dhatu* and lastly it convert into *ojas*, ultimately increase in *ojas* and similarly increase in immunity. One who adopts Ayurvedic principles in day to day life will become free from diseases and can lead healthy and prosperous life.

REFERENCES

1. K Sembulingam Prema Sembulingam, Jaypee The Health Sciences Publisher New Delhi, Edition-2016 Essential of Medical Physiology Seven Edition, Chapter 15 page no-105.
2. Dr. V. L. N. Sastry, Chaukhambha Orientalia Varanasi Edition-2009 Kaumarabhrtyam (Paediatrics in Ayurveda), Chapter 7-Immunity & Immunuzation(Vyadhi Ksamatvaka Sakti-Tat Prakriyas), page no-131.
3. Prof.K.R. Srikantha Murthy, Chaukhambha Orientalia Varanasi Edition- 2004 Susruta Samhita (Text, English translation, Notes, Appendeces and Index) Vol- 1, sutrasthana 20/4. Page no-144.
4. Dr. V. L. N. Sastry, Chaukhambha Orientalia Varanasi Edition-2009 Kaumarabhrtyam (Paediatrics in Ayurveda), Chapter 7-Immunity & Immunuzation(Vyadhi Ksamatvaka Sakti-Tat Prakriyas), page no-132.
5. Dr. V. L. N. Sastry, Chaukhambha Orientalia Varanasi Edition-2009 Kaumarabhrtyam (Paediatrics in Ayurveda), Chapter 7-Immunity & Immunuzation(Vyadhi Ksamatvaka Sakti-Tat Prakriyas), page no-135.
6. Vd. Harish Chandra Singh Kushwaha, Chaukhambha Orientalia Varanasi, Edition-2011 Caraka samhita shri chakrapani virachita ayurveddipika ki ayushi Hindi- Commentary firat part, Sutrasthan 28/7 Page- 472.
7. Vd. Harish Chandra Singh Kushwaha, Chaukhambha Orientalia Varanasi, Edition-2011 Caraka samhita shri chakrapani virachita ayurveddipika ki ayushi Hindi- Commentary firat part, Sutrasthan 1/53, Page- 23.
8. Dr. P.S. Byadgi, Chaukhambha Publications New Delhi, Edition-2018 Parameswarappa's Ayurvediya

- Vikrti-Vijnana & Roga Vijnana, vol-1, Chapter 15 page no-293.
9. Prof.Dr.M.Srinivasulu, Chawkhamna Sanskrit Series Office Varanasi Edition- 2009 Fundamentals of Kayacikitsa, Chapter 9 page no-280.
 10. Prof.Dr.M.Srinivasulu, Chawkhamna Sanskrit Series Office Varanasi Edition- 2009 Fundamentals of Kayacikitsa, Chapter 9 page no-276-280.
 11. Vd. Harish Chandra Singh Kushwaha, Chaukhambha Orientalia Varanasi, Edition-2011 Caraka samhita shri chakrapani virachita ayurveddipika ki ayushi Hindi- Commentary firat part, Sutrasthan11/36, Page- 172.
 12. Prof.Dr.M.Srinivasulu, Chawkhamna Sanskrit Series Office Varanasi Edition- 2009 Fundamentals of Kayacikitsa, Chapter 9 page no- 282.
 13. Dr.S. Suresh Babu, Chaukhambha Orientalia Varanasi, Edition-2015, The principles and practice of Kaya Cikitsa(Ayurveda's Internal Medicine) vol-1, Chapter12, page no-116.
 14. Vd. Harish Chandra Singh Kushwaha, Chaukhambha Orientalia Varanasi, Edition-2011 Caraka samhita shri chakrapani virachita ayurveddipika ki ayushi Hindi- Commentary firat part, Sutrasthan 11/36, Page- 172.
 15. Dr.S. Suresh Babu, Chaukhambha Orientalia Varanasi, Edition-2015, The principles and practice of Kaya Cikitsa(Ayurveda's Internal Medicine) vol-1, Chapter12, page no-116.
 16. Prof.Dr.M.Srinivasulu, Chawkhamna Sanskrit Series Office Varanasi Edition- 2009 Fundamentals of Kayacikitsa, Chapter 9 page no- 282.
 17. Vd. Harish Chandra Singh Kushwaha, Chaukhambha Orientalia Varanasi, Edition-2011 Caraka samhita shri chakrapani virachita ayurveddipika ki ayushi Hindi- Commentary firat part, Sutrasthan 11/36, Page- 172.
 18. Dr.S. Suresh Babu, Chaukhambha Orientalia Varanasi, Edition-2015, The principles and practice of Kaya Cikitsa(Ayurveda's Internal Medicine) vol-1, Chapter12, page no-116.
 19. Prof.Dr.M.Srinivasulu, Chawkhamna Sanskrit Series Office Varanasi Edition- 2009 Fundamentals of Kayacikitsa, Chapter 9 page no- 282.
 20. Dr.S. Suresh Babu, Chaukhambha Orientalia Varanasi, Edition-2015, The principles and practice of Kaya Cikitsa(Ayurveda's Internal Medicine) vol-1, Chapter12, page no-118.
 21. Vd. Harish Chandra Singh Kushwaha, Chaukhambha Orientalia Varanasi, Edition-2011 Caraka samhita shri chakrapani virachita ayurveddipika ki ayushi Hindi- Commentary firat part, Chikitsa sthan24/31, Page- 625.
 22. Prof.K.R. Srikantha Murthy, Chaukhambha Orientalia Varanasi Edition- 2004 Susruta Samhita (Text, English translation, Notes, Appendices and Index) Vol- 1, sutrasthana 15/21-22. Page no-104.
 23. Dr.S. Suresh Babu, Chaukhambha Orientalia Varanasi, Edition-2015, The principles and practice of Kaya Cikitsa(Ayurveda's Internal Medicine) vol-1, Chapter12, page no-119.
 24. Dr. P.S. Byadgi, Chaukhambha Publications New Delhi, Edition-2018 Parameswarappa's Ayurvediya Vikrti-Vijnana & Roga Vijnana, vol-1, Chapter 16 page no-308-309.
 25. Vd. Harish Chandra Singh Kushwaha, Chaukhambha Orientalia Varanasi, Edition-2011 Caraka samhita shri chakrapani virachita ayurveddipika ki ayushi Hindi- Commentary firat part, Sarirsthana 6/13, Page- 831.
 26. Dr. P.S. Byadgi, Chaukhambha Publications New Delhi, Edition-2018 Parameswarappa's Ayurvediya Vikrti-Vijnana & Roga Vijnana, vol-1, Chapter 15 page no-304.