

**STUDY OF SHUKRA DHATU  
WITH SPECIAL REFERENCE TO  
SARVADEHIK SHUKRA**

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**Under the Board of studies**

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**Year 2018.**

## **CERTIFICATE OF THE SUPERVISOR**

It is certified that work entitled **“STUDY OF SHUKRA DHATU WITH SPECIAL REFERENCE TO SARVADEHIK SHUKRA”** is an original research work done by Vda. Sumati S. Khot Under my supervision for the degree of Doctor of Philosophy in Ayurveda-Rachana Sharrir to be awarded by Tilak Maharashtra Vidyapeeth, Pune. To best of my knowledge this thesis

- Embodies the work of candidate herself
- Has duly been completed
- Fulfils the requirement of the ordinance related to Ph.D. degree of the TMV
- Up to the standard in respect of both content and language for being referred to the examiner.

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# DECLARATION

I, Vdya.Sumati S. Khot, hereby declare that the thesis entitled “**Study of ShukraDhatu with special reference to SarvadehikShukra**” completed and written by me has not previously formed the basis for the award of any degree or other similar title or any other university or examining body.

Place- Pune

Date- 05/10/2018

Vd. Mrs. SumatiSudhirKhot

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Vd. Mrs. SumatiSudhirKhot

Ph.D. Scholar

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## LIST OF ABBRIVATIONS

अ.हृ.सू.	अष्टांगहृदय सूत्रस्थान
च.चि.अ	चरकसंहिताचिकित्सास्थानअध्याय
सु.नि.अ	सुश्रुतसंहितानिदानस्थानअध्याय
च.सू	चरकसंहितासूत्रस्थान
सु.सू.	सुश्रुतसंहितासूत्रस्थान
च. चि.	चरकसंहिताचिकित्सास्थान
च. वि.	चरकसंहिताविमानस्थान
सु. उ.	सुश्रुतसंहिताउत्तरतन्त्र
अ.हृ.शा.	अष्टांगहृदय शारीरस्थान
सु.शा.	सुश्रुतसंहिताशारीरस्थान
च. शा.	चरकसंहिताशारीरस्थान

# **INTRODUCTION**

**Title:**

**Study of *Shukra Dhatu* with special reference to *Sarvadehik Shukra***

**Introduction:**

आयुः कामयमानेन धर्मार्थसुखसाधनम्।

आयुर्वेदोपदेशेषु विधेयः परमादरः ॥

अष्टांगहृदय सुत्रस्थान द्व

*Ayurveda* is an ancient science and heritage of India. *Ayurveda* is the *Upaved* of *Atharvaveda*. *Dharma* (virtue), *Artha* (wealth), *Kama* (desire) and *Moksha* (liberation) are the objectives of human life. To achieve these *Purusarthas*, one should follow the principles of *Ayurveda*. One should avail the knowledge in *Ayurveda* from literature of *Ayurveda* texts and eminent *Gurus* and also from scholars in this field.

In the world of globalization, where we are trying to propagate *Ayurvedic* science up to every person in the world; it is our duty to prove that *Ayurveda* is an evidence based science. Basic scriptures of *Ayurveda* were written in ancient time. The concepts and *Siddhantas* quoted in the texts are based on observations made by the *Acharyas* and by *Anuman Praman*. At that time, as there was no advanced technology as we experience today, some concepts still remain unexplained. So to read between the lines and to prove our science, that it is an evidence based science, we have to re-validate these concepts in *Ayurveda* with the help of modern research methodology.

While studying the *samhitas* especially *Bruhat-Trayi*, there is ambiguity regarding certain terminologies with reference to *Sharir*, e.g. *Kalaa, Kloma, Shukra, Oja, Sira, Dhamani, Nadi, Peshi, Snayu, Kandara*, etc. Among these *Shukra Dhatu* is one of the important concept that need to be explored in a proper scientific way.

दोषधातुमलमूलं सदा देहस्य.....॥ अ. ह.सु ११/१



Human body is made-up of dhatus i.e basic forms of body tissue. The function of a *Dhatu* is to support (*Deha Dharanaat*) and nourish (*Poshanaat*) the body. *Shukra Dhatu* is the seventh *Dhatu* in the body. *Shukra Dhatu* is highlighted for the function of reproduction only. But all *Tridoshas*, *Saptadhatu* and *Trimalas* are present when conception occurs. All functions of *Dosha*, *Dhatu* and *Mala* are carried out from the time of the conception up to the end of the life. *Dosha*, *Dhatu* and *Mala* are said to be the tripod of the life.

रस इक्षौ यथा दधि सर्पिस्तैलं तिले यथा।  
 सर्वत्रानुगतं देहे शुक्रं संस्पर्शने तथा॥  
 तत् स्त्री-पुरुषसंयोगे चेष्टासंकल्पपीडनात्।  
 शुक्रं प्रच्यवते स्थानाज्जलमाद्रात्पटादिव॥

च. चि.अ २पा ४/४६-४७

विशस्तेष्वपि गात्रेषु यथा शुक्रं न दृश्यते  
 सर्वदेहाश्रितत्वाच्च शुक्रलक्षणमुच्यते॥  
 तदेव चेष्टयुवतेर्दर्शनात् स्मरणादपि।  
 शब्दसंश्रवणात्स्पर्शात् संहर्षाच्च प्रवर्तते।  
 सुप्रसन्नं मनस्तत्र हर्षणे हेतुरुच्यते॥

सु. नि. अ १०/१९-२१

For the purpose of this study, *Shukra Dhatu* is mentioned as *Sarvadehik Shukra* and *Sthanik Shukra*. As *Shukra Dhatu* is concerned with *Navnirmiti* in the body, we have to focus on the *Sarvadehik Shukra* which nourishes the *Sthanik Shukra* as explained in the above *Shloka*.

शुक्रं धैर्यं च्यवनं प्रीतिं देहबलं हर्षं बीजार्थं च ॥

सु.सू. १५-५

*Dhairya, Chyavan, Priti, Harsha, Dehabala and Bijartha* are the functions of *Shukra Dhatu* which are functioning from the birth up to the end of the life. But *Bijathra* (reproduction) is the main function of *Shukra Dhatu* and that is initiated at the time of puberty. *Bijartha* function is carried out by *Sthanik Shukra* i.e semen in male and artava in female. All other functions of *Shukra Dhatu* are governed by the *Sarvdehik ShukraDhatu*.

दशैवायतनान्याहुः प्राणा येषु प्रतिष्ठिताः ।

शङ्खौ मर्मत्रयं कण्ठो रक्तं शुक्रौजसी गुदम् ॥

च.सू. २९-३

*Shukra* is one of the *Pranayatan* according to the *AyurvedicSamhitas*. *Prana* is continuous state (अव्याहत) of the *Sharir* and that is why functioning of *Shukra Dhatu* is a continuous process throughout the life. So it is very important to focus on the *Sarvdehik Shukra*.

The *Sarvdehik* functions of the *Shukra Dhatu* can be compared with vigor in the body. As vigor is defined as “**A 3-tired sustained mood state characterized by physical energy, emotional energy, and mental focus.**”<sup>1</sup>

Previous researchers in *Ayurveda* have mainly focused on the *Sthanik Shukra* i.e semen and *Arthva*. In this study, concept of *Sarvadehik Shukra* will be explored.

There is another ambiguity that every cell in the body reproduces the same type of another cell throughout the life time. The function of reproduction on cellular level is seen from the time of conception up to the end of the life. Then which bhav padartha is responsible for all this function? Due to advance technology, scientific researchers are achieving the advance knowledge. We may find out the specific function or

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<sup>1</sup>Vigor 7 Days to Unlimited Energy, Focus & wellbeing by Shwan M Talbott, Ph.D,LDN,FACSM p6

phenomenon for the cell division in the body which may be co-related to the function of *Shukra Dhatu*. *Shukra* is considered as a reproductive tissue for regeneration and cell division.

In the present scenario, present generation is facing lots of problems related to puberty, infertility, menstrual cycle, menopause; which may be minimized if we make efforts to focus on *Sarvadehik Shukra*. Hereditary diseases are the diseases which are caused by abnormal sperm and ovum. Sperm and ova transmit the genetic traits of the individual. *Prakruti* of an individual is dependent on *Shukra* and *Shonita* (one of the factor). Morbidity in *Shukra* and *Shonita* manifests diseases like *Prameha*, *Rajyakshma*, *Sthaulya*, *Kushtha*, etc. Infertility is a problem of global proportions affecting on an average 8-12% of couples worldwide.<sup>2</sup> As purity of *Sthanik Shukra* and *Artava* and formation of *Ojas* are dependent on the *Saratva* of *Sarvadehik shukra*, so focus of the study is on *Sarvadehik Shukra*.

Due to changing life style, pollution, hybrid food items, work tensions, competition have an effect on the health of individuals. If the *Sapta Dhatus* do not get nourishment properly, *Dhatudushti* will occur. *Dhatus* are essential for *Dharan* and *Poshan* of the body (to support and to nourish). All *Dhatus* are formed serially one from the other i.e from *Rasa Dhatu* to *Shukra Dhatu* by *Kedar-Kulya-Nyaya*. *Shukra* is the final *Dhatu* which is responsible for *Garbhodpadhan* and formation of *Ojas*. Formation of *Shukra Dhatu* is from *Majja Dhatu*. This can be understood by the study of *Sarvadehik Shukra*.

Now a day, we are facing lots of problems every day concerned with traffic, finance, family problems, worries, competition, etc in every field which causes immediate effect on the hormonal balance which are circulating throughout entire body.

As *Sarvadehik Shukra* can be evaluated by physical, mental and emotional state of the person; analysis of the person having low vigor, depression and anxiety has been carried out. Evaluation of the subject is

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<sup>2</sup>Clinical study of *Tribulus terrestris* linn. In oligozoospermia: A double blind study, Thirunavukkarasu Sellandi, Anup B Thakar, Madhav singh baghel, Ayu 2012 Jul-Sep; 33(3):356-364

done by giving *Ashwagandha (Withania Somnifera, Dunal) churna vati* for one month as *Ashwagandha (Withania Somnifera, Dunal)* works on *Sarvadehik Shukra*. (Ch.Chi.30/181-185)

*Ashwagandha (Withania Somnifera, Dunal)* is a non toxic traditional Indian medicinal herb and acts on *Sarvadehik Shukra* as mentioned in *Bhavprakash Nighantu*. It has *Madhura Rasa* and *Vipaka*. *Shukra* is also *Jal Mahabhuta Pradhan, Soumya* and *Madhura Gunatamak*.

अश्वगंधाऽनिलश्लेष्मश्चित्र शोथ क्षयापहा।

बल्या रसायनी तिक्ता कषायोष्णातिशुक्रलः॥

सार्थ भावप्रकाश पुर्वार्ध गुडुच्यादिवर्ग १९०

According to modern researchers, *Ashwagandha (Withania Somnifera, Dunal)* works on HPA axis and neuro-endocrine system. It has effect on cortisol which is the stress hormone. It acts as an adaptogen.<sup>3</sup> It has benefits on patients with anxiety also. Withanolides present in *Ashwagandha (Withania Somnifera, Dunal)* are thought to act as hormonal precursors. Sleep is the one of the factor for Vigour (*Vrushata*) and impotence (*Klibata*). *Ashawagandha (Withania Somnifera, Dunal)* has sedative activity also. So *Ashwagandha (Withania Somnifera, Dunal)* is selected as a drug to evaluate *Sarvadehik Shukra*.

निद्रायत्तं सुखं दुःखं पुष्टिः काश्यं बलाबलम्॥

वृषता क्लीबता ज्ञानमज्ञानं जीवितं न च॥

अ.ह.सु.७/५३-५४

The traditional use of '*Ashwagandha (Withania Somnifera, Dunal)*' is to increase energy, youthful vigour, endurance, strength, health,

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<sup>3</sup> *Withania somnifera*: A Rejuvenating Ayurvedic Medicinal Herb for the treatment of various Human ailments, veena Sharma, Sadhana Sharma, Pracheta, Ritu Paliwal, IJPTRF, Coden(USA) Vol.3, No.1, pp187-192

nurture the elements of the body, increase vital fluids, muscle fat, blood, lymph, semen and cell production.<sup>4</sup>

Focus of the study is on *Sarvadehik* function of the *Shukra* i.e. *Bala* means *Sharirik Bala*(physical strength) and *Mansik Bala* (mental strength), *Harsh*(happiness), *Utsaha*(elation), *Priti*(love),*Dhairya*(courage/fortitude).*Sharirik Bala* and *Mansik Bala* are interdependent on each other and other functions are also concerned with mental health.

*Charakacharya* has explained that *Shoka*, *Chinta*, *Bhaya*, *Krodha*, *Irsha*, all these mental factors are responsible for *shukrakshinta*. So for evaluation of *Sarvdehik Shukra* questionnaire analysing all these mental factors were given to the subjects.

अतीवचिन्तनाच्चैव शोकात्क्रोधद्वयाद् तथा ॥

ईर्ष्योत्कण्ठामदोद्वेगान् सदाविशति यो नरः।

कृशो वा सेवते रूक्षमन्नपानं तथौषधम्॥

दुर्बलोप्रकृतिश्चैव निराहरो भवेद्यदि।

असात्म्यभोजनाच्चापि हृदये यो व्यवस्थितः॥

रसः प्रधानधातुर्हि क्षीयेताशु ततो नृणाम्।

रक्तादयश्च क्षीयते धातवस्तस्य देहिनः॥

शुक्रावसानास्तेभ्योऽपि शुक्रं धामं परं मतम्।

च.चि ३०/१८१-१८५

*Shukra Dhatu* is present in both males and females which can be understood by its karmas. *Shukra Dhatu* is a functional entity, not only the structural one. The status of *Shukra* and psychological factors influence each other. *Shukra* which is present in the entire body, gets activated (*Pravrutta*) due to *Saumanasya* (*pleasant mind*), *Harsha* (*sexual*

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<sup>4</sup>Withania somnifera: A Rejuvenating Ayurvedic Medicinal Herb for the treatment of various Human ailments, veena Sharma, Sadhana Sharma, Pracheta, Ritu Paliwal, IJPTRF, Coden(USA) Vol.3, No.1, pp187-192

*desire*),etcand *ShukraDhatu* in turn provides psychological factors such as *Dhairya*, etc.

The function of *Shukra* are said to be:-

*Dhairya*- courage/fortitude/sexually potent

धैर्यं शौर्यं शुरुत्वम्।

धैर्यमविषादेन----- परिक्षेत्।

च.वि.४/८

धैर्यम् विपद्यपि मनसोऽदैन्यम्।

आयुर्वेददिपिका टिकाधैर्यम् अनुन्नतिश्चेतसः।च.सू.१/५८

आयुर्वेददिपिकाचक्रपाणि टिकाधैर्यम् धृतिश्चेतसः

स्थिरत्वमचापलम्। अ.हृ.सू.१/२६ अरुणदत्तटिका

*Chyavan*- ejaculation at proper time.

च्यवनं शीघ्रत्वेनावस्त्रंसनं।सु.सू१५/५ डल्हणटिका निबंधसंग्रह

*Priti*- love towards partner.

प्रीतिं स्नेहं प्रमदासुः।

प्रीतिं तोषेण-----परिक्षेत्। च.वि.४/८

*Harsha*- happiness/excitement/ sexual desire.

हर्षं उत्कण्ठजननं प्रमदासुः।

अप्रहर्ष आनन्दाभावः। सु.उ.३९/२६ डल्हण टिका

हर्षमामोदेन-----परिक्षेत्। च.वि.४/८

*Dehabal*-physical strength.

देहबलमुत्साहोपचय लक्षणं।सु.सू१५/५ डल्हणटिका निबंधसंग्रह

सत्वं मनः मनसो बलं वा यत् उत्साह उच्यते।

च.सू.११/३६चक्रपाणि टिका

*Beejartha*- toserve the function of *Beeja* i.e procreation.

*Dehabal* can be achieved from the strength of all dhatus. *Dhairya* is *Manasik Bhav* which comes with the physical strength. These are the *Manasik bhavas* which are required for the *Garbhotpadan Karma*. All these functions of *Shukra Dhatu* show the mental status of *Sharir* i.e *Sthir Chitta, Manobala, Aanand, Adainya, Avishad* etc. So to evaluate these *Mansik Bhavas* tests related to anxiety, depression and vigour were taken.

➤ **Aim:**

To study the concept of *Shukra Dhatu* with special reference to *Sarvadehik Shukra Dhatu*.

➤ **Objectives**

1. To study references about *Shukra Dhatu* from Ayurveda as well as allied *Shastras*.
2. To study *shukral karma* of *Ashwagandha (Withania Somnifera, Dunal)* on subjects with the help of vigor test.



**Hypothesis:-**

*Shukral Karma* of *Ashwagandha*(*Withania Somnifera*,*Dunal*) improves vigor index and *Ayurvedic* parameters and reduces Hamilton's Rating scale and ICD-10 scale, which is confirming the concept of *Sarvadehik Shukra* according to *Ayurveda*.

**Null Hypothesis:-**

*Shukral Karma* of *Ashwagandha*(*Withania Somnifera*, *Dunal*) does not improve vigor index and *Ayurvedic* parameters and does not reduce Hamilton's Rating scale and ICD-10 scale and hence does not confirm the concept of *Sarvadehik Shukra* according to *Ayurveda*.

## **Ayurvedic Literature review**

*Sharir* is built up of *Dosha*, *Dhatu*, and *Mala*. *Dosha* are the tripod of life. *Tridoshas* are *Vata*, *Pitta* and *Kapha*. The body is made up of seven *Dhatu*s. The seven *Dhatu*s are *Rasa*, *Rakta*, *Mansa*, *Meda*, *Asthi*, *Majja* and *Shukra* in the body. These are the basic tissues in the body. *Dhatu* is that which supports body, mind and life (*Pran*). The functions of *Dhatu*s are *Dharana*-to support and *Posana* –to nourish. *Purisha*, *Mutra* and *Swed* are three *Malas*.

### **Synonyms of *Shukra***

1. *Paurush*
2. *Virya*
3. *Pumstva*
4. *Retas*
5. *Anandasamudbhav*
6. *Rupadravya*
7. *Indriya*
8. *Majjarasa*
9. *Tej*
10. *Purushatvam* etc.

*Shukra* means bright, resplendent, radiant, planet venus, a month of *Jyestha*. Meanings of *shukra* is clear, pure, *Soma*, light coloured, white, any clear fluid, the essence of anything, semen, seeds of animals (male and female).

*Shukra* is the core nutrient of *Majjadhatu* (*Majjasarbhut*). Among the seven *Dhatu*s, *Shukra* is the seventh *Dhatu* in the body. *Shukra Dhatu* is formed from *Majjadahatu*. This verse could be applicable during foetal life (*Kshirdadhinyaya*). After that *Rasa Dhatu* provides essential substances to the remaining *Dhatu*s for their complete growth and maintenance (*Kedar-kulya Nyaya and Eka-kal Nyaya*). In this reference, *Sushrut* has clearly noted that in one month *Shukra* in males and *Arthva* in females are produced from *Rasa Dhatu* but however according to

*Charaka* it takes seven days. *Shukra* is formed in *Shukradharakala*. *Ojas* is formed from *Shukra* as the essence of the all *Dhatu*s.

स्त्रीणां शुक्रं न गर्भाय भवेद् गर्भाय चार्तवम्।

सु. सू. १४।१४चक्रदत्तटीका

स—एवं मासेन रसः शुक्रीभवति स्त्रीणां च आर्तवम्।

सु. सू.१४।१४

केचिदाहुरहोरत्रात् षट्हादपरे परे।

मासेन याति शुक्रत्वम् अन्नं पाकक्रमादिभिः॥

अ. हृ. शा.३।६६

*Shukra dhatu* is found in the entire body. It contains extract of all other *Dhatu*s. *Shukra* is present in the body in invisible manner such as ghee which is present in milk and jaggery in sugarcane. Its presence is not visible to naked eyes but it can be monitored through its functions.

यथा पयसि सर्पिस्तु गूढश्चेक्षौ रसो यथा।

शरीरेषु तथा शुक्रं नृणां विद्याद् भिषग्वरः॥

सु.शा. अ ४/२०-२१

विशस्तेष्वपि गात्रेषु यथा शुक्रं न दृश्यते

सर्वदेहाश्रितत्वाच्च शुक्रलक्षणमुच्यते॥

तदेव चेष्टयुवतेर्दर्शनात् स्मरणादपि।

शब्दसंश्रवणात्स्पर्शात् संहर्षाच्च प्रवर्तते।

सुप्रसन्नं मनस्तत्र हर्षणे हेतुरुच्यते॥

सु. नि. अ १०/१९-२१

*Shukra* is the best term to describe the factors which are responsible for nourishment of the both male and female reproductive tissue. Reproduction is one of the main functions of the *Shukra Dhatu*. Betterment of complexion, strength (mental and physical),

affection, happiness, appreciation, courage, elation for conception and penile erection are the other functions which are governed by *Shukra Dhatu*.

शुक्रं धैर्यं च्यवनं प्रीतिं देहबलं हर्षं बीजार्थं च ॥

सु.सू. १५-५

दशैवायतनान्याहुः प्राणा येषु प्रतिष्ठिताः ।

शङ्खौ मर्मत्रयं कण्ठो रक्तं शुक्रौजसी गुदम् ॥

च.सू. २९-३

*Shukra* is one of the *Pranayatan* and it is essential to sustain of life and present in both sexes from the time of birth. It is fully developed in females by the age of 16 years and in males by the age of 22-25 years i.e at the time of puberty. During childhood it is not visible. It is in the dormant stage like the fragrance hidden in the buds of the flower or fruit situated within flower. The fire located within the wood cannot be noticed without specific effort similarly *Shukra* requires specific efforts for its full development and proper time also.

यथा हि पुष्पमुकुलस्थो गन्धः न शक्यमिहारतीति वक्तुं नैव वा नास्तीति अथ चास्ति सतां भावानां अभिव्यक्तिः इति कृत्वा, केवल सौक्ष्म्यान्नाभिव्यज्यते स एव विवृतपत्रकेशरे पुष्पे कालातरेण अभिव्यक्तिं गच्छति। एवं बालानामपि वयःपरिणामाच्छुक्रप्रादुर्भावो भवति, रोमराज्यादयश्च विशेषां नारीणाम्।

सु. सू. १४।१८

Adolescence is a period when a care free child becomes a responsible adult. Puberty is defined as the state of being functionally capable of procreation. It is also time for the development of secondary sexual characters. This state of reproductive competence along with full development of all *Dhatu*s is described as *Samarthagata Viryatava* by *Sushrut*.

पञ्चविंशो ततो वर्षे पुमान्नारी तु षोडशे ।

समत्वागतवीर्यो तौ जानीयात्कुशलो भिषक् ॥

सु. सू. ३५-१३

During the adolescence, the circulating steroid hormones stimulate the proliferation in numbers of circulating red blood corpuscles.

Frisch and Revelle (1970-1971) postulated the relationship between body weight and age of onset of pubertal events. They showed by the analysis of body components that lean body weight to fat ratio is altered from menarche to post menarche from 5:1 to 3:1. During this period of adolescence muscles, fat, bones, marrow all grow rapidly. But most important of all these tissue is the bone marrow. From infancy to maturity the red marrow of long bones is converted in to yellow bone marrow.

At the puberty fatty yellow marrow forms 6% of total body weight. This significantly contributes to extra gonadal estrogen production. Other extra gonadal sites of production are fat and adrenal cortex. Androgens are aromatized to estrogen by the fat tissue. These steroids from marrow by their positive feedback to hypothalamus activate the hypothalamo-pituitary and gonadal axis. This leads to establish the events of menstrual cycle.

*Sarvadehik Shukra* can be comparable to the circulating steroid hormones produced in gonads and other tissues in the body. In treatment of all the abnormalities concerned with *Shukra Dhatu; Majja* (bone marrow) is the most important tissue. Modern researches have established a prime role for bone marrow in activation of hypothalamic-pituitary axis in initiating gonadal function as explained by classic. Natural menopause is an age related decline in endocrine function of ovaries due to exhaustion of follicle pool.<sup>5</sup>

*Ardhanjali* is the *Pramana* of the *Sarvdehik Shukra* as described in the classics i.e 8Tola=80ml. It cannot be linked with semen or *Artava* as

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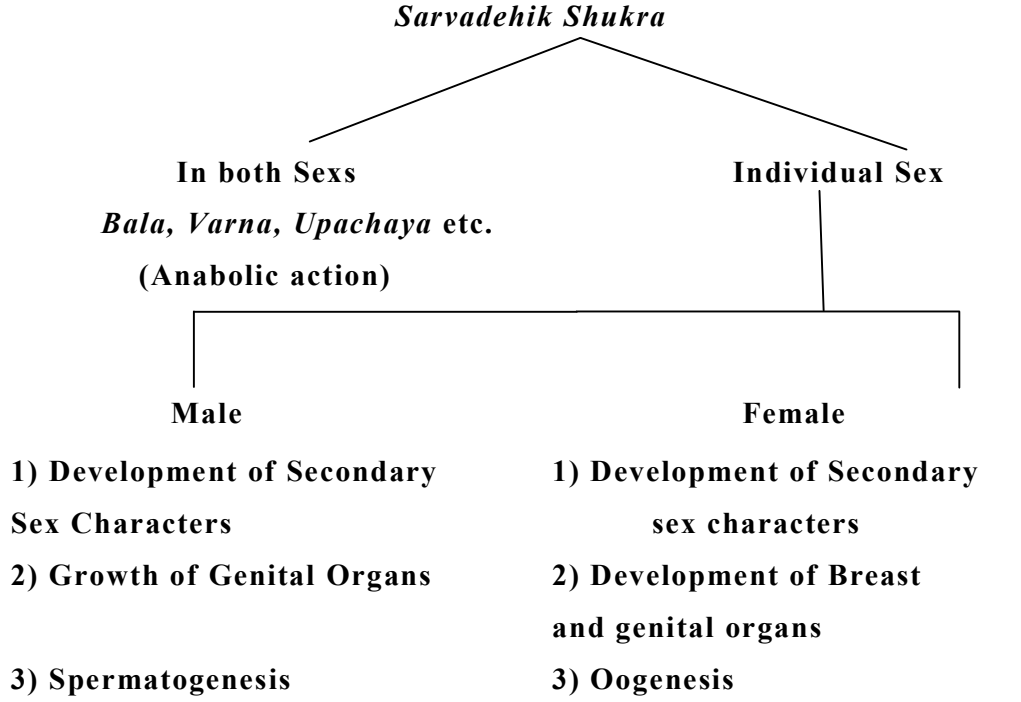
<sup>5</sup>Scientific Foundation of Ayurveda Dr.H.S. Palep, Chaukhamba Sanskrit Pratishthan, Delhi. 1<sup>st</sup> edition 2004 p108-110

according to both *Charaka* and *Sushruta* the *Shukra* is the *Saptam Dhatu* and is circulating throughout the body.

अर्धाजलिः शुक्रस्य।

च. शा. ७।१४

According to the classics, *Shukra* can be explained as follows



***Beej* or seed**

**In male Sperms**

**Female Ovum (*Aartav*)**

In all *Ayurvedic* compendia, *Shukra* is described as

1. *Sarvadehik Shukra*

2. *Sthanik or Beeja Shukra*.

*Sarvadehik Shukra* is pervading throughout the body and *Sthanik Shukra* or *Beejabhut Shukra* is semen (*Virya*) in male and *Aartava* in female.

स खलु त्रीणि त्रीणि कलासहस्राणि पञ्चदश च कला एकैकस्मिन्  
धाताववतिष्ठते; एवं मासेन रसः शुक्रं स्त्रीणां चार्तवं भवति ॥

सु.सु.१४/१४

So sperms with spermatic fluid are considered as *Sthanik Shukra* in male and menstrual blood with ovum in female as *Beejabhut Shukra*. But in female excretions of Bartholin's, cervical and endometrial glands excreted during coitus is also considered as *Sthanik Stree Shukra*<sup>6</sup>.

*Seven Kalas* appear as structure intervening between *Dhatu*s and their *Asayas*. The seventh one is *Shukradhara Kala* which pervades the whole body of all persons. Semen is ejaculated through urethra having reached there from two fingers on the right (left) side below the opening of bladder. (*Vrushan*)

सप्तमी शुक्रधरा नाम या सर्वप्राणिनां सर्वशरीरव्यापिनी।

यथा पयसि सर्पिस्तु गूढश्चेक्षौ रसो यथा।

शरीरेषु तथा शुक्रं नृणां विद्याद् भिषग्वरः॥

सु.शा. अ ४/२०-२१

द्वयंगुले दक्षिणे पार्श्वे बस्तिद्वारस्य चाप्यधः।

मूत्रस्त्रोतःपथाच्छुक्रं पुरुषस्य प्रवर्तते॥

कृत्स्नदेहाश्रितं शुक्रं प्रसन्नमनस्तथा।

स्त्रीषु व्यायच्छतश्चापि हर्षात्तत् संप्रवर्तते॥

<sup>6</sup> Ayurvediya Prasutitantra evam Streerog First part Prof. Premvati Tiwari Chaukhamba Orientaliya Varansi 2<sup>nd</sup> edition p 54-56

सु. शा. अ ४/२२-२३

This reference is related to *Sthanik Shukra*, in male it is present in testes and in female it is present in ovaries. Sperms, some sex hormones and other seminal secretions are formed in testes which mix with other secretions from prostate gland and seminal vesicles to form semen or *Virya*. In female, ovaries along with fimbrial end of fallopian tubes, uterus to interior of vagina can be considered as seat of *Shukradhara Kala* as it is passage of *Artava*. So the local membrane system of the genitalia including the membrane system of reproductive organs in both sexes can be considered as *Shukradhara Kala*.

Considering *sarvadehik shukra*, *shukradhara Kala* can be compared to stem-cell system, androgenesis, or membrane system of endocrine glands related to sex hormones and growth hormones. According to *Dalhana*, the *Shukradhara KalaisSarvavyapi* because the effects of orgasm are felt in the entire body but its special locations are *Vrishana* and *Medhra*.

शुक्रवहे द्वे तयोमूलं स्तनौ वृषणौ च।

सु. शा. अ९/१२

शुक्रवहानां स्रोतसां वृषणौ मूलं शोफश्च॥

च. वि. अ ५/१७

*Shukra Dhatu* is present in both males and females which should be understood by their function and is present in the entire body. So *Srotas* mentioned in the classics are for the *Sthanik Shukra*. According to Charak *Vrishna* and *Shepha* are the *Mula Sthan* of *Sukravaha Srotas*. *Stana* (breast) and *Vrushanare* the *Mula Sthan* of *Shukravaha Srotas* as per *Sushrut*. *Srotas* or channels are circulatory passages, which carry the dhatus undergoing transformation.

यावन्तः पुरुषे मूर्तिमन्तो भावविशेषास्तावन्त एवास्मिन् स्रोतसां प्रकारविशेषाः। सर्वे हि भावा पुरुषे नान्तरेण स्रोतांस्यभिनिर्वर्तन्ते, क्षयं



वाऽप्यभिगच्छन्ति। स्रोतांसि खलु परिणाममापद्यमानानां धातूनामभिवाहीनि  
भवन्त्ययनार्थेन॥ च.वि.५/३

So it is clear that it is not *Sarvadehik Shukra Dhatu* which is circulating in the *Shukravaha Srotas* but it is *Beejabhut Shukra*. *Artavavaha Srotas* is equivalent to *Shukravaha Srotas* in female as *Beejabhut Shukra* in female is *Artava*.

In *Nara-Shanda* and *Nari-Shanda*, *Prajotpadak Shukra* is functionless, however *Sarvadehik Shukra* is functioning well otherwise the person would not live.

*Nara Shanda* and *Nari Shanda* explain the inability of taking part in sexual act and reproduction but *Shukra Dhatu* should be present invariably in each and every living individual, otherwise the whole concept of *Sapta Dhatu* itself will be proved wrong.

While studying *Sarvadehik Shukra*, *Shukra Sara Lakshanani* are to be observed as they are reflected on the entire body. They are as follows

सौम्याः सौम्यप्रेक्षिणः क्षीरपूर्णालोचना इव प्रहर्षबहुलाः

स्निधवृत्तसारसमसंहतशिखरदशनाः प्रसन्नस्निग्धवर्णस्वराः भ्राजिष्णवो

महास्फिचश्च शुक्रसाराः। ते स्त्रीप्रियोपभोगाः बलवंतः

सुखैश्वर्यारोग्यवित्तसंमानापत्यभाजश्च भवन्ति।

च. वि. अ ८/१४-७-११-७

स्निग्धसंहतश्लेतास्थिदंतनखं बहुलकामप्रजं शुक्रेण॥ सु.सू.३५।१६

1. *Saumya* (gentle)
2. *Saumyapreksinaha* (gentle look)
3. *Kshirpuranalochana* (eyes appearing as filled with milk)
4. *Praharshabahula* (cheerfulness)
5. *Singadha-Vritta-Samhata Dashanaha* (teeth are unctuous, round, strong, dense, even)
6. *Prasana-Snigdha-Varnasara* (pleasant, unctuous voice and complexion)
7. *Bhrajisnuta* (glittering appearance)
8. *Mahaspica* (large buttocks)

9. *Stripriya* (loved by opposite sex)
10. *Upbhoga*
11. *Balavanta* (strong)s
12. *Sukha* (endowed with happiness)
13. *Aishwarya* (prosperity)
14. *Arogya* (health)
15. *Vitta* (money)
16. *Sammana* (honour)
17. *Apatyabahula* (many offspring)

*Sthanik Shukra* i.e semen in male is like quartz, white, liquid, unctuous (viscus), sweet, sweet smelling like honey, cold in potency, more in quantity, slimy, thick inconsistency and resembles like ghee, oil or honey, such *Shukra* will be suitable for producing embryo.

स्फटिकाभं द्रवं स्निग्धं मधुरं मधुगंधि च।

शुक्रमिच्छन्ति केचित्तु तैलक्षौद्रनिभं तथा॥

सु.शा. २।११

In female *Artavais* considered as *Shukra* for conception. *Artava*(menstrual fluid) resembles like the blood of rabbit or solution of lac and which does not stained the cloth. Such *Artavais* said to be pure.

*Sushrut* while explaining the *peshis* has mentioned that the *peshis* which are present at testicles of men similiar type of *Peshis* are present at ovaries of female. By applying *Tantrayukti*, inference can be drawn that function of testies and ovaries is same i.e formation of *Beeja* (sperms and ovum)

**Literature review of *Ashwagandha*(*Withania Somnifera*,  
*Dunal*)**

*Ashwagandha*-Indian ginseng (Winter Cherry)

Botanical name- *Withania Somnifera*, Dunal

Family- Solanaceae (Solamen=comforting)German Botanist

Latin name- *Withania*=Withan (scientist);*sommnifera*=sleep producing

English name- Winter cherry

*Sanskrit* names-

*Balada, Gandhanta, Vajinama, Vajini, Pushtida, Punya,*  
*Vataghni, Balya, Hayahya, Vrusha, Varahakarni, Varada,*  
*Kushthagandhini, Hayahvaya, Vajigandha, Turgagandha.*

अश्वगंधाऽनिलश्लेष्मश्चित्र शोथ क्षयापहा।

बल्या रसायनी तिका कषायोष्णातिशुक्रलः॥

सार्थ भावप्रकाश पुर्वार्ध गुडुच्यादिवर्ग १९०

अश्वगंधा वाजिगंधा कञ्चुकाऽश्वारोहकः।

वाराहकर्णी तुरगी बल्य वाजिकारि स्मृता॥

धन्वतरि निघण्टु गुडूच्यादि प्रथमोवर्गः

अश्वगंधावाजिगंधा कम्बुकाष्ठ वराहिका।

वराहकर्णी तुरगी वनजा वाजिनी हयी॥

पुष्टिदा बलदा पुण्या हयगंधा च पीवरा।

पलाशपर्णी वातघ्नी श्यामला कामरुपिणी॥

कालप्रियकरी बल्या गंधपत्री हयप्रिया।

वराहपत्री विज्ञेया त्रयोविंशतिनामिका॥

राजनिघण्टु शताह्वादिश्चतुर्थो वर्गः

गन्धन्ता वाजिनामादिरश्वगंध हयाहवया।

वरहकर्णी वरदा बलदा कुष्ठगंधिनी॥

भावप्रकाश निघन्टु गुडूच्यादि वर्गः

Vernacular names-<sup>7</sup>

English- Winter cherry

Hindi- Asgandh, punir.

Bengali - Ashvaganda, Kak-nuj.

Gujarathi-Ghodakum, Ghoda, Asoda, asan.

Kannada-Viremaddinagaddi, Kiremallinagida, Yiremaddinagadde.

Malayalam-Amukkuram.

Marathi- Askandha, Tilli, Asvagandha, Kanchuki.

Punjabi- Asgand, Isgand, Aksan, Vaman, Nagauri.

Rajsthani- Chirpotan.

Tamil- Amukkira, Amukkirakkilangu, Amulang kalung, Asvagandhi.

Telgu- Vajigandha, Pennirugadda, Pulivendramu, Penneru.

Arabic- Kakanajehindi.

Oriya- Asua-ganaha.

Persian- Kaknajehindi, Mebernanbarari.

Urdu- Asgandanagaori

**Gana-** *Balya, Bruhaniya, Madhurskandha (C)*

**Kula-** *Kantakari kula*

Xerophytic plant

Roots, leaves and fruits have medicinal properties.

**Location (Habitat)**-Dry places such as Rajasthan, Punjab, Haryana, Uttar Pradesh, Gujarat, Maharashtra and Madhypradesh in India, Sind, Sri Lanka, Afghanistan, Baluchistan.

Fresh roots are collected during January to March and dried under shade for several days. The drug retains its therapeutic efficacy for less

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<sup>7</sup>Database on Medicinal Plants used in Ayurveda Vol 3 P.C. Sharma, M.B. Yelne, T.J. Dennis Central Council for Research in Ayurveda & Sidha, New Delhi 2001 pg88.

than two year.<sup>8</sup>Tender wet roots smell like horse so it is called as *ashwagandha*.After taking *ashwagandha* (*Withania Somnifera*, Dunal),it makes the person energetic like horse i.e physically and sexually.

Varieties- There are two varieties viz. 1) Cultivated and 2) Wild. The wild variety is sedative, hallucinative, diuretic and used externally. Cultivated variety is used internally.<sup>9</sup>

**Ayurvedic properties-**

**Guna:** *Laghu, Snigdha.*

**Rasa:** *Madhur, Kashay, Tikta.*

**Vipak:** *Madhur.*

**Veerya:** *Ushna.*

**Dosha:** *Kapha Vata Shamak.*

**Karma:**<sup>10</sup>

*Shothahara, Vedanasthapana, Mastishkashamaka, Deepana, Anulomana, Shoolaprashmana, Krimighna, Raktashodhaka, Kaphaghana, Shwasahara, Vajikarana, Garbhashayashothahara, Yonishoolahara, Mootrala, Kushthaghna, Balya, Brinhana, Rasayana*

**Rogagnata:**<sup>11</sup>

*Galaganda, Granthishotha, Daurbalya, Vatavyadhi, Urustambha, Murchchha, Bhrama, Anidra, Udaravikara, Krimi, Raktabharadhikya, Rktavikara, Shotha, Kasa, Shwasa, Shukradaurabalya, Pradara, Yonishoola, Mootraghata, Shvitra, Kushtha, Kshaya, Balashosha, Shosha.*

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<sup>8</sup>Phytochemical and Pharmacological Profile of *Withania somnifera* Dunal: A Review, QamarnUddin, L.Samiulla, V.K.Singh and S.S.Jamil, Journal of Applied Pharmaceutical Science 02(01) Jan 2012, p170-175

<sup>9</sup> Ayurvedic Pharmacology & Therapeutic Uses of Medicinal Plants Dravyagunavignyan Vaidya V.M.Gogate Chaukhambha Publications New Delhi 2009 pg302.

<sup>10</sup>Database on Medicinal Plants used in Ayurveda Vol 3 P.C. Sharma, M.B. Yelne, T.J. Dennis Central Council for Research in Ayurveda & Sidha, New Delhi 2001 pg89.

<sup>11</sup>Database on Medicinal Plants used in Ayurveda Vol 3 P.C. Sharma, M.B. Yelne, T.J. Dennis Central Council for Research in Ayurveda & Sidha, New Delhi 2001 pg89.

**External uses:**

It reduces oedema and pain, that is why leaves or root paste is applied on enlarged cervical glands or swelling of other glands. In *Vata* diseases and weakness, oil massage is done. The juice of *Ashwagandha* (*Withania Somnifera*, Dunal) leaves is used as eardrops in ear discharge.

**Internal uses:**

**Nervous system:** As it is a sedative and nervine tonic, it helps in atonic nerves, fainting, giddiness and insomnia.

**Digestive system:** The bark powder is appetizer, carminative and antihelminthic and hence used in abdominal pain, constipation and worms.

**Circulatory system:** It has an effect on the heart, purifies the blood and reduces oedema. So it is used for weakness of heart, blood disorders and oedema. Its decoction is used in rheumatoid arthritis.

**Respiratory system:** It is an expectorant and has antiasthmatic property, due to which it is useful in cough. *Ashwagandha* (*Withania Somnifera*, Dunal) with ghee and honey is effective in asthma.

**Reproductive system:** *Ashwagandha* (*Withania Somnifera*, Dunal) is well known for its aphrodisiac property. It is used in semen disorders and leucorrhoea caused due to endometritis.

**Urinary system:** It is a diuretic and so used in oligouria.

**Skin:** It is used in vitiligo and other skin diseases. Black ash of the root is applied on blisters.

**Satmikaran:** It increases weight, improves immunity and is an aphrodisiac.

**Dose:** powder 3-5 gm.

**Formulations:**

*Ashwagandhadi churna, Ashwagandha rasayan, Ashwagandhaghrit, Ashwagandharishta, Ashwagandha taila, Madhyamanarayana taila, Brihachchhagaladya ghrita, Saraswata churna, Pramehamihira taila, Nagabala ghrita, Askandpak, Maharasanadi, Sukumarghrit, Saubhagyasunthipak.*

**Srotogamitva:**

**Dosha:** *Vata Kapha Samak*

**Dhatu:** *Shukra* (aphrodisiac), *Atishukrala*, *Mansa*, *Meda* (nourishing), *majja* (induces sleep, sedative).

**Mala:** *Mutra* (stop burning)

**Organs:** Genitals (both sexes)<sup>12</sup>

कंदिनी वाजिगंधा स्यात् क्षुपा पर्पोटिवत् फला।

वनजा वृत्तपर्णी च कंदो वाजीकरः स्मृतः॥

### **Morphology-**

*Withania Somnifera* is an evergreen, erect, branching, tomentose (covered with a dense mat of woolly hairs) shrub, 30-150 cm in height. Flowers are greenish or lurid yellow, small about 1 cm long. Fruits are globose berries, 6 cm in diameter, orange red when mature, enclosed in the inflated and membranous persistent calyx. Seeds are yellow reniform and 2.5 mm in diameter.

### **Macroscopic-**

The stout fleshy roots when dried are cylindrical gradually tapering down, straight, unbranched 10-17.5 cm long and 6-12 mm diameter. The outer surface of the roots is brownish white and interior is creamy white. They have a strong odour and mucilaginous bitter and acrid taste.

### **Microscopic-**

The young root has a single layered epidermis followed by a parenchymatous cortex of 4-5 layers of cells, the endodermis being conspicuous by the presence of casparian stripes. The cork cambium arises in the outermost layer of the cortex. The endodermis persists even after the secondary growth has been taken place.<sup>13</sup>

### **Phytochemical study-**

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<sup>12</sup>Ayurvedic Pharmacology & Therapeutic Uses of Medicinal Plants Dravyagunavignyan Vaidya V.M. Gogate Chaukhamba Publications New Delhi 2009 pg 302-303

<sup>13</sup>Phytochemical and Pharmacological Profile of *Withania somnifera* Dunal: A Review, Qamarn Uddin, L.Samiulla, V.K.Singh and S.S.Jamil, Journal of Applied Pharmaceutical Science 02(01) Jan 2012, p170-175

The presence of various chemical constituents in the roots of the plant-

The roots contain alkaloids, amino acids, steroids, volatile oil, starch, reducing sugars, glycosides, hentriacontane, dulcitol, withanol, an acid and a neutral compound. The amino acids reported from roots include aspartic acid, glycine, tyrosine, alanine, glutamic acid and cysteine. Many bio-chemical heterogeneous alkaloids, including cuscohygrine, anahygrine, tropine, pseudotropine, cuscohygrine, anaferine, isopelletierine, withananine, somniferinine. Neutral alkaloids include 3-tropanylglycolate and an unidentified alkaloid.

#### **Pharmacological Activities-**

Hypotensive, bradycardiac and respiratory stimulant, antibacterial, hypothermic, immuno-suppressive, immuno-stimulatory, immuno-modulatory, adaptogenic, antitumour, radiosensitising, antistress, anticonvulsant, psychotropic, CNS depressant, antioxidant, anti-inflammatory, antispasmodic, analgesic, antipyretic, antiviral, antiarthritic, sedative, cardiotropic, cardioprotective, anticoagulant, antiageing, cytoprotective.<sup>14</sup>

#### **Pharmacological studies-**

*Ashwagandha* (*Withania Somnifera*, Dunal) is traditional Indian medicinal herb. It is a sedative, diuretic, aphrodisiac, anti-inflammatory, antiarthritic, antibiotic activity, anti tumour activity. It is also increases energy, endurance and acts as adaptogen / anti-stress. *Ashwagandha* (*Withania Somnifera*, Dunal) has immuno-stimulatory(modulatory) activity also.<sup>15</sup> It is also having hepatoprotective, anti-hyperglycaemic, anti cancer, anti-oxidant and anti-aging properties.

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<sup>14</sup>Database on Medicinal Plants used in Ayurveda Vol 3 P.C. Sharma, M.B. Yelne, T.J. Dennis Central Council for Research in Ayurveda & Sidha, New Delhi 2001 pg91-92.

<sup>15</sup>Traditional and Medicinal Uses of *Withania Somnifera* M. Umadevi, R.Rajeshwari, C. Sharmial Rahale, S. Selvavenkadesh, R. Pushpa, K. P. Sampath Kumar, Debjit Bhowmik The Pharma Innovation Vol.1 No.9 2012 p102-110



*Ashwagandha*(*Withania Somnifera, Dunal*) stimulates immune system, increases memory and helps to maintain general health and wellness. It is known to increase production of bone marrow and semen (cell production). Patients with anxiety can also benefit from *Ashwagandha*.(*Withania Somnifera, Dunal*)

*Ashwagandha*(*Withania Somnifera, Dunal*) acts as a *Rasayan* to increase health and longevity. *Rasayan* drugs contribute in revitalizing the tissues. It considered an adaptogen which is non toxic herb. It works on nonspecific basis to normalize physiological function and on the HPA axis and neuro-endocrine system. It rejuvenates the reproductive organs.

*Ashwagandha*(*Withania Somnifera, Dunal*) increases haemoglobin concentration, RBC count, platelet count and hair melanin. It stabilizes blood sugar and lowers cholesterol. It has spermatogenic action and enhances *Ojas*.<sup>16</sup>

As an adaptogenic it helps to minimize stress related variation in the diet and help to encourage weight loss. Cortisol is the stress hormone that goes up during stress. Serum cortisol levels are substantially reduced due to the *Ashwagandha*(*Withania Somnifera, Dunal*).

Withanolides are thought to act as hormonal precursors that can convert into human physiological hormone as needed.

*Withania* in *Ashwagandha* is appearing to stimulate stem cell proliferation and improve red blood cell, white blood cell and platelet parameters.<sup>17</sup>

#### **Side effect-**

*Ashwagandha*(*Withania Somnifera, Dunal*) does not have any significant side effect reported in the medical literature. Excessive doses of *Ashwagandha*(*Withania Somnifera, Dunal*) may cause abortions.<sup>18</sup>

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<sup>16</sup>Traditional and Medicinal Uses of *Withania Somnifera* M. Umadevi, R.Rajeshwari, C. Sharmial Rahale, S. Selvavenkadesh, R. Pushpa, K. P. Sampath Kumar, Debjit Bhowmik The Pharma Innovation Vol.1 No.9 2012 p102-110

<sup>17</sup> Antistress activity of *Ashwagandha* (*Withania Somnifera Dunal*)- A Review Gajaramal Amit Ashok, Shende M.B., Chothe D.S. IAMJ vil.2 Issue3; May-June2014 p386-393.

<sup>18</sup> Traditional and Medicinal Uses of *Withania Somnifera* M. Umadevi, R.Rajeshwari, C. Sharmial Rahale, S. Selvavenkadesh, R. Pushpa, K. P. Sampath Kumar, Debjit Bhowmik, The Pharma Innovation Vol.1 No.9 2012 p102-110

### **Substitutes and Adulterants-**

*Ashwagandha* (*Withania Somnifera*, Dunal) is used as a substitute for *Kakoli* and *Kshirakakoli* of Ashtavarga, which are identified as *Lilium Polyphyllum* D. Don and *Fritillaria Roylei* Hook. As per *Ayurvedic Formulary of India, Part-I*, published by Govt. of India.<sup>19</sup>

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<sup>19</sup>Database on Medicinal Plants used in Ayurveda Vol 3 P.C. Sharma, M.B. Yelne, T.J. Dennis Central Council for Research in Ayurveda & Sidha, New Delhi 2001 pg91-92.

## Plant of Ashwagandha



Ashwagandha plant with flowers



Ashwagandha plant with fruits



Roots of Ashwagandha



## Modern Literature Review

### Vigor in Ancient Medicine

Psychology researchers describe the opposite state of Burnout as something called “Vigor,” which is defined as “a 3-tiered sustained mood state characterized by physical energy, emotional energy, and mental focus.”

The modern scientific description of Vigor can be compared to the ancient descriptions of vitality and wellness from traditional medicine systems around the world. In every ancient culture, there typically has been a common belief that true health stems from a strong “lifeforce” in the body. Other names for this life force, or Vigor, include:

- Qi (traditional Chinese medicine; pronounced “chee”)
- Ki (Kampo/Japanese medicine)
- *Prana* (*Ayurvedic*/Indian medicine)
- Ka (Egyptian medicine)
- Mana (Polynesian medicine)
- Pneuma (ancient Greece)

Feelings of low Vigor are common in our modern stress-filled world. Millions of us succumb to chronic stress and end up feeling “tired, stressed and depressed” because of specific metabolic imbalances (specifically, disruptions in hormones like cortisol and testosterone, and neurotransmitters like dopamine and norepinephrine) that lead to feelings of reduced Vigor. By naturally restoring metabolic hormone balance, we can dramatically reduce feelings of stress, cut fatigue and depression by half, boost physical and mental energy, and significantly improve Vigor.<sup>20</sup>

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<sup>20</sup>Vigor 7 Days to Unlimited Energy, Focus & wellbeing by Shwan M Talbott, Ph.D,LDN,FACSM p6

## **Hormone**

Hormone is a substance that is released in one tissue and through the circulation it reaches the target tissue where it elicits a particular response. Only a minute amount of hormone is required to produce changes in the cell metabolism.

The endocrine organs are ductless glands which secrete hormones that have actions at remote sites. They have an important regulatory influence on cellular metabolism.<sup>21</sup>

### **Control of Hormone Secretion Rate – The Role of Negative Feedback**

Without exception, the rate of secretion of every hormone that has ever been studied is itself controlled very exactly by some internal control system. In most instances this control generally is exerted through a negative feedback mechanism as follows:

1. The endocrine gland has a natural tendency to oversecrete its hormone.
2. Because of this tendency, the hormone exerts more and more of its control effect on the target organ.
3. The target organ in turn performs its function.
4. But when too much function occurs, usually some factor about the function then feeds back to the endocrine gland and causes a negative effect on the gland to decrease its secretory rate. Thus the function of the hormone is monitored by the control mechanism and this information in turn provides negative feedback control of the secretory rate by the gland.<sup>22</sup>

### **Control of Hormone Secretion -**

Hypothalamic releasing hormones are secreted in nanogram amounts, and have short half-lives of a few minutes. Anterior pituitary hormones are produced in microgram amounts and have longer half-lives,

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<sup>21</sup> Clinical Endocrinology Late P.J.Mehata, Vimala Paul (Retnam), Nihar p. Mehata Fourth Edition 2012 p01

<sup>22</sup> Textbook of Medical Physiology Arthur C. Guyton, John E. Hall, Ninth Edition p928

while peripheral hormones can be produced in up to milligram amounts daily, with much longer half-lives.<sup>23</sup>

### **Hypothalamus**

In the past, the pituitary gland was considered the master endocrine gland. Now the hypothalamus has superseded the pituitary gland because it regulates the secretion of pituitary hormones. The hypothalamus is a small neuro-endocrine structure situated below the thalamus, with the pituitary gland below it. It weighs about 4 grams. The hypothalamus is a complicated collection of nerve cells and fiber tracts which helps to regulate many autonomic functions and body rhythms.

The ventral hypothalamus consists of three major systems.

- A. Classic neuronal pathway** through the base of the brain and through the autonomic nervous system pathways that terminates in the liver, gastro-intestinal tract, pancreas, adrenal medulla and adipose tissue. This involves appetite control, temperature control and body fat stores.
- B. A neurosecretory pathway** involved in osmoregulation through the production of AVP (arginine vasopressin) and in Parturition and nursing through the secretion of oxytocin.
- C. A neuro-endocrine system** involving clusters of peptide and mono-amine secreting cells in the ventral hypothalamus which regulates the secretions of anterior pituitary hormones.

The hypothalamus has specialized neurons called the neuro-secretory cells or magnocellular neurons (so called because of their large size). These function both as neurons and hormone secreting cells. The hypothalamus, along with the pituitary gland, thus acts as an intimate link between the nervous system and the endocrine system.

The neuro-secretory cells of the supraoptic and paraventricular nuclei synthesize oxytocin and vasopressin. Their unmyelinated tracts, pass

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<sup>23</sup> Williams Textbook of Endocrinology Henry M. Kronenberg, Shlomo Melmed, Kenneth S. Polonsky, P. Reed Larsen Eleventh Edition p09

through the median eminence to terminate in the posterior lobe of the pituitary.

The other hormones of the endocrine hypothalamus regulate the adenohypophysis. These adenohypophysiotrophic releasing and inhibiting factors are synthesized in the ventromedial and arcuate nucleus of the hypothalamus. Gonadotropin releasing hormone (GnRH) is secreted by the pre-optic nucleus. These neurosecretions are transported to the primary capillary network of the pituitary portal system. In addition to providing route for hypothalamic control, the portal vessels carry most of the blood supply to the anterior lobe of the pituitary.

Neurosecretory neurons of the hypothalamus are regulated both by neural inputs (positive control) and concentration of circulating hormones (negative feedback control). Circulating hormones also act at the pituitary level to determine pituitary sensitivity to hypothalamic hormones.

All the hypothalamus hormones, whose function has been determined so far, have a stimulatory effect on the pituitary except prolactin. All of the hypothalamic hormones whose structure has been determined are peptides except dopamine. Dopamine, whose major role is to function as a neurotransmitter, is the most important physiologic inhibitor of prolactin. The hypothalamus also contains a large concentration of catecholamines-norepinephrine, dopamine, serotonin and peptides. These amines control the secretion of hypophysiotrophic hormones e.g. dopamine stimulates GH and inhibits prolactin in normal person. Paradoxically in acromegaly it suppresses GH. This has a therapeutic implication.



## Regulation of anterior pituitary hormones by hypothalamus

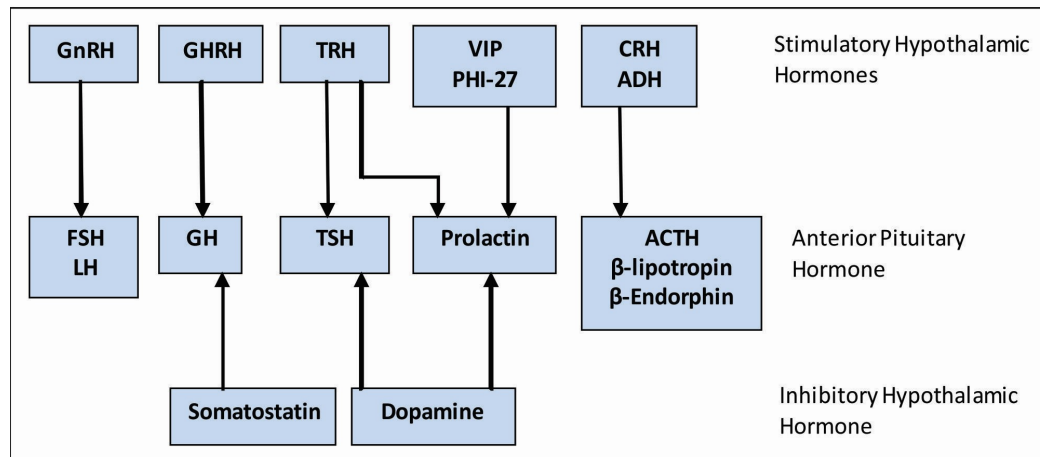


Fig. Regulation of anterior pituitary hormones by hypothalamus

## Regulation of hypothalamic and pituitary hormones

The control of hypothalamic hormone secretion is best appreciated, when considered with the respective pituitary hormone that it regulates. This consists of feed-back (closed loop) system primarily blood borne on which are superimposed other signals from central nervous system (open loop) mediated by neurotransmitters the open loop is affected by environmental changes (light, dark, temperature), stress (pain, fear, psychic) and intrinsic rhythmicity of the hormone. Thus both external and internal environmental factors are determinants of the activity of these systems.<sup>24</sup>

## Pituitary Gland

The pituitary gland lies at the base of the brain in a bony cavity, within the sphenoid bone. The word pituitary originates from the *Greek* word *ptuo* meaning to spit and the Latin word *Pituita* meaning mucus.<sup>25</sup> Galen hypothesized that nasal phlegm originated from the brain and drained via the pituitary gland. It is now clear that together with the

<sup>24</sup>Clinical Endocrinology Late P.J.Mehata, Vimala Paul (Retnam), Nihar p. Mehata Fourth Edition 2012 p07-08

<sup>25</sup>Clinical Endocrinology Late P.J.Mehata, Vimala Paul (Retnam), Nihar p. Mehata Fourth Edition 2012 p10

hypothalamus, the pituitary orchestrates the structural integrity and function of endocrine glands including the thyroid, adrenal, and gonads, in addition to target tissues including cartilage and breast. The pituitary stalk serves as an anatomic and functional connection to the hypothalamus. Preservation of the hypothalamic pituitary unit is critical for integration of anterior pituitary control of sexual function and fertility, linear and organ growth, lactation, stress responses, energy, appetite and temperature regulation and secondarily for carbohydrate and mineral metabolism.<sup>26</sup>

The normal gland is in the sella turcica, within the sphenoid bone. The normal gland weighs approximately 0.6 gm and measures 10mm-13mm-6mm. The gland is situated within the bony sella turcica and it is overlaid by the dural diaphragm sella, through which the stalk connects to the median eminence of the hypothalamus.

Anatomically, embryologically and functionally the pituitary gland is divided into three separate parts—the anterior, intermediate and posterior pituitary. The anterior pituitary (adenohypophysis) is derived from the Rathke's pouch (which is an upward evagination of the stomodeum). The intermediate lobe is derived from the dorsal half of Rathke's pouch, and the posterior pituitary from the infundibular process (which is a downgrowth from the floor of the diencephalon).<sup>27</sup>

The hypothalamus contains nerve cell bodies that synthesize hypophysiotropic releasing and inhibiting hormones, as well as the neurohypophysial hormones of the posterior pituitary (AVP and oxytocin).

The five distinct hormone secreting cell types are present in the mature anterior pituitary gland. Corticotroph cells express pro-opiomelanocortin (POMC) peptides including adrenocorticotrophic hormone, (ACTH); somatotroph cells express growth hormone (GH); thyrotroph cells express the common glycoprotein  $\alpha$ -subunit and the specific thyroid stimulating hormone (TSH)  $\beta$ -subunit; gonadotrophs

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<sup>26</sup>Williams Textbook of Endocrinology Henry M. Kronenberg, Shlomo Melmed, Kenneth S. Polonsky, P. Reed Larsen Eleventh Edition p155

<sup>27</sup>Clinical Endocrinology Late P.J.Mehata, Vimala Paul (Retnam), Nihar p. Mehata Fourth Edition 2012 p10

express the *alpha* and *beta* subunits for both follicle-stimulating hormones (FSH) and luteinizing hormone (LH); the lactotroph expresses prolactin (PRL). Each cell type is under highly specific signal controls, which regulate their respective differentiated gene expression.<sup>28</sup>

The anterior, intermediate and posterior lobes of the pituitary gland are actually 3 separate endocrine organs and secrete totally 10 hormones. They are as follows:

1. Anterior Pituitary: TSH, ACTH, FSH, LH, prolactin and G.H.
2. Intermediate Lobe : MSH and beta MSH
3. Posterior Pituitary : Oxytocin and Arginine Vasopressin (AVP)

The 3 pituitary glycoprotein hormones FSH, LH and TSH are made up of 2 subunits alpha and beta. All the subunits of these hormones are similar. It is the beta subunit that confers hormonal specificity.

## **PHYSIOLOGY OF PITUITARY HORMONES**

### **Growth hormone**

Growth hormone is a polypeptide hormone secreted by acidophilic somatotrope cells of the anterior pituitary. Its secretion is pulsatile throughout the day with the highest peak about an hour of sleep. It circulates bound to growth hormone Binding Protein.

The functions of GH include anabolic effects of increase in height in children and growth of bone and cartilage. It is responsible for increase in muscle mass, promoting glycogenesis, lipolysis and protein synthesis and stimulating the growth of all organs including the brain. Its actions are mediated through IGF-1 which is secreted by the liver.

### **Thyroid stimulating hormone (TSH)**

This is one of the three glycoproteins secreted by the pituitary. It is secreted in a pulsatile manner and in circadian fashion. It is secreted by the thyrotropes of the pituitary. It has 2 alpha and 2 beta chains. The beta chain is unique to TSH. The alpha chains are similar in hCG, LH and FSH, which are the other glycoprotein hormone secreted by the pituitary.

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<sup>28</sup>Williams Textbook of Endocrinology Henry M. Kronenberg, Shlomo Melmed, Kenneth S. Polonsky, P. Reed Larsen Eleventh Edition p156

TSH acts on thyroid receptors found on cell membrane of the thyroid gland and causes increased T-4 and T-3 production and secretion.

### **Adrenocorticotrophic hormone(ACTH)**

It is a polypeptide hormone secreted by the anterior pituitary. It results in increased production and release of cortico-steroids from the adrenal glands. ACTH acts through the ACTH receptors located on the adrenal cortex resulting in synthesis and secretion of glucocorticoids and mineralocorticoids and androgenic steroids. ACTH stimulates the lipoprotein uptake and increases bioavailability of cholesterol in adrenal cortex.

### **Gonadotropins (Gn)**

There are two main Gonadotropin hormones Follicle stimulating hormone Follicle stimulating hormone (FSH) and Luteinizing hormone (LH). Gonadotropins act on cell membrane through Gnreceptors under control of gonadotropins releasing hormone (GnRH) of the hypothalamus. In males, FSH stimulates spermatogenesis in the testes and in females FSH acts on the follicle growth in the ovaries. In men FSH acts on the Sertoli cells to stimulate a peptide called Inhibin. Inhibin selectively suppresses FSH without affecting LH. LH stimulates Leydig cells of testes in males and theca cells of the ovarian follicles in females. LH induces ovulation from the developed follicle.

Other human Gn is produced in the placenta during pregnancy. hMG (human menopausal gonadotropin) is a mixture of FSH,LH and hCG extracted and purified in urine of post menopausal women.<sup>29</sup>

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<sup>29</sup>Clinical Endocrinology Late P.J.Mehata, Vimala Paul (Retnam), Nihar p. Mehata Fourth Edition 2012 p10

## **Endocrine functions of the Male and Female reproductive system**

### **Testes**

#### **Testicular Functions**

The testes have two functions-hormonal and spermatogenic.

1. Hormonal function involves the synthesis and secretion of testosterone by interstitial cells of Leydig which are found interspersed between the seminiferous tubules.
2. Spermatogenic function involves the production of sperms by the sertoli cells of seminiferous tubules.

Both spermatogenesis and testosterone secretion are under the control of the gonadotrophic hormones secreted by the anterior pituitary. FSH acts on the germinal epithelium to promote spermatogenesis whereas LH (ICSH) induce the Leyding cells to secrete androgens and oestrogens. In the embryonic development Testosterone and Dihydro-testosterone induce the Wolffian duct and virtulisation of the external genitalia. In the prepuberal stage the gonadotropins are secreted in small amounts. At puberty the secretion increases, stimulating testosterone and oestrogens.

At puberty testosterone promotes somatic growth and development of secondary sexual characters. In adults it is necessary for spermatogenesis stimulation of libids and normal sexual functions.

Testosterone is the major androgen produced by the Leyding cells of the testes. It is also produced by the adrenal cortex in both sexes and by the ovaries in females. For its action it requires conversion to active metabolite-dihydrotestosterone (DHT) by an enzyme 5 a reductase and this can occur both in the circulation and target tissue. Testosterone is transported in the blood, bound to a globulin called testosterone levels in blood show circadian rhythmicity with higher levels at 8 A.M and lower levels between midnight and 4 A.M. They are higher in men than in women.

**Puberty Changes Due to Testosterone:** (Adrenarche-occurs at 6-8 years of age)

Testosterone stimulates growth of the male sex organs; also promotes the development of male secondary sex characteristics.

1. **External genitalia:** The penis and scrotum increase in size and become pigmented. Rugae appear in the scrotal skin.
2. **Hair:** Moustache and beard develop and the scalp hair line undergoes recession, the public hair grows upwards into a typical diamond shape. Hair all over the body especially axilla and the anal region develops.
3. **Height:** the growth spurt at puberty is due to testosterone.
4. **Sex organs:** It stimulates the seminiferous tubules. The secretory activity of the prostate gland and the seminal vesicles develops. The growth of testes is the 1<sup>st</sup> sign of puberty.
5. **Voice:** The pitch is lowered due to laryngeal enlargement and thickening of the vocal cords.
6. **Psyche:** Aggressive attitudes are manifested. Libido and sexual potential are developed.
7. **Miscellaneous:** Increase in weight muscle mass and increased sebum secretion may occur.<sup>30</sup>

### **The OVARIES**

The ovary has two functions-hormonal and gametogenic.

1. The hormonal function consists of secretion of Oestrogens and progesterone.
2. Gametogenic function is to produce ova capable of being fertilized and developing into foetus.

Estrogen and progesterone cause maturation and maintenance of the female genitalia and secondary sexual characters. Progesterone is secreted by corpus luteum which is formed from the ruptured Graafian follicle. These ovarian functions are controlled by the pituitary gonadotropins, LH and FSH.

### **Functions of Estrogens**

1. Initiating and maintaining maturity of the female genitalia and the secondary sexual characters.
2. Maintaining and controlling normal menstruation.

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<sup>30</sup>Clinical Endocrinology Late P.J.Mehata, Vimala Paul (Retnam), Nihar p. Mehata Fourth Edition 2012 p179

3. Stimulating the linear growth, although excessive levels may cause premature fusion of the epiphyses.
4. Reducing bone resorption and improving bone formation.
5. Deposition of subcutaneous adipose tissue in a characteristic fashion as in a mature female.
6. Inhibiting the pituitary secretion of FSH.
7. In large doses, they causes
  - a. Sodium and water retention.
  - b. Painful swelling of the breast
  - c. Dysfunctional uterine bleeding
  - d. Nausea and vomiting.

#### **Functions of progesterone**

1. Preparation of the endometrium for implantation of the fertilized ovum and the maintenance of pregnancy.
2. Suppression of uterine contractility.
3. Inhibition of ovulation during pregnancy.
4. Make cervical mucus permeable to sperm.
5. Stimulates secretion of “uterine milk” by the uterine endometrial glands.
6. Helps to promote development of the secretory apparatus of the breasts
7. In large doses it causes:
  - a. Acne
  - b. Pyrogenic effice
  - c. Breast tenderness
  - d. Cholestatic jaundice
  - e. Decresed menstrual loss
  - f. Virilisation of female foetus<sup>31</sup>

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<sup>31</sup>Clinical Endocrinology Late P.J.Mehata, Vimala Paul (Retnam), Nihar p. Mehata Fourth Edition 2012 p182

## **PRODUCTION OF ESTROGEN IN THE MALE**

In addition to testosterone, small amounts of estrogens are formed in the male (about one-fifth the amount in the nonpregnant female), and a reasonable quantity of them can be recovered from a man's urine.

The exact source of the estrogens in the male is doubtful, but the following are known:

(1) The concentration of estrogens in the fluid of the seminiferous tubules is quite high and probably plays an important role in spermiogenesis. This estrogen is believed to be formed by the Sertoli cells by converting some of the testosterone to estradiol.

(2) Estrogens are formed from testosterone and androstanediol in the other tissues of the body, especially the liver, probably accounting for as much, as 80 per cent of the total male estrogen production.<sup>32</sup>

### **Physiology of Puberty**

Gonadotropins and sex hormones are secreted during infancy and childhood and a feedback system operates between hypothalamus pituitary and gonads. It is set at a low level so that small amounts of sex hormones secreted by gonads are enough to inhibit secretion of hypothalamic releasing hormones and pituitary gonadotropins.

The onset of puberty is triggered by decrease in sensitivity of hypothalamus to sex hormones so that the hypothalamic releasing hormones and pituitary gonadotropins rise leading to elevated sex hormones which bring about the physical changes of puberty. The hypothalamic sensitivity depends on genetic factors, nutritional factors and critical body weight.<sup>33</sup>

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<sup>32</sup>Textbook of Medical Physiology Arthur C. Guyton, John E. Hall, Ninth Edition p1010

<sup>33</sup>Clinical Endocrinology Late P.J.Mehata, Vimala Paul (Retnam), Nihar p. Mehata Fourth Edition 2012 p185



## **ANTERIOR PITUITARY HORMONES**

1. Growth hormone: cause growth of almost all cells and tissues of the body.
2. Adrenocorticotropin: causes the adrenal cortex to secrete adrenocortical hormones.
3. Thyroid-stimulating hormone: cause the thyroid gland to secrete thyroxine and triiodothyronine.
4. Follicle-stimulating hormone: causes growth of follicles in the ovaries before ovulation; promotes the formation of sperm in the testes.
5. Luteinizing hormone: plays an important role in causing ovulation; also causes secretion of female sex hormones by ovaries and testosterone by the testes.
6. Prolactin: promotes development of the breasts and secretion of milk.

## **POSTERIOR PITUITARY HORMONES**

1. Antidiuretic hormone (also called vasopressin): causes the kidneys to retain water, thus increasing the water content of the body; also in high concentrations, causes constriction of the blood vessels throughout the body and elevates the blood pressure.
2. Oxytocin: contracts the uterus during the birthing process, thus helping expel the baby; also contracts myoepithelial cells in the breasts, thereby expressing milk from the breasts when the baby suckles.

## **CONTROL OF PITUITARY SECRETION BY THE HYPOTHALAMUS**

Almost all secretion by the pituitary is controlled by either hormonal or nervous signals from the hypothalamus. Indeed, when the pituitary gland is removed from its normal position beneath the hypothalamus and transplanted to some other part of the body, its rates of secretion of the different hormones (except for prolactin) fall to low levels in the case of some of the hormones, to zero.

Secretion from the posterior pituitary is controlled by nerve signals that originate in the hypothalamus and terminate in the posterior pituitary. In contrast, secretion by the anterior pituitary is controlled by hormones called hypothalamic releasing and inhibitory hormones (or factors)

secreted within the hypothalamus itself and then conducted, to the anterior pituitary through minute blood vessels called hypothalamic-hypophysial portal vessels. In the anterior pituitary, these releasing and inhibitory hormones act on the glandular cells to control their secretion.

The hypothalamus in turn receives signals from almost all possible sources in the nervous system. Thus, when a person is exposed to pain, a portion of the pain signals is transmitted into the hypothalamus. Likewise, when a person experiences some powerful depressing or exciting thought, a portion of the signal is transmitted in to the hypothalamus. Olfactory stimuli denoting pleasant or unpleasant smells transmit strong signal components directly and through the amygdaloid nuclei in the hypothalamus. Even the concentrations of nutrients, electrolytes, water and various hormones in the blood excite or inhibit various portions of the hypothalamus. Thus, the hypothalamus is a collecting centre for information concerned with the internal well-being of the body, and in turn, much of this information is used to control secretions of the many globally important pituitary hormones.

### **FUNCTION OF THE RELEASING AND INHIBITORY HORMONES IN THE ANTERIOR PITUITARY**

The function of the releasing and inhibitory hormones is to control the secretion of the anterior pituitary hormones. For most of the anterior pituitary hormones, it is the releasing hormones that are important, but for prolactin, an inhibitory hormone probably exerts most control. The important hypothalamic releasing and inhibitory hormones are the following:

1. Thyrotropin-releasing hormone (TRH), which causes release of thyroid-stimulating hormone.
2. Corticotropin-releasing hormone (CRH), which causes release of adrenocorticotropin.
3. Growth hormone releasing hormone (GHRH), which causes release of growth hormone, and growth hormone inhibitory hormone (GHIH), which is the same as the hormone somatostatin and which inhibits the release of growth hormone.

4. Gonadotropin releasing hormone (GnRH), which causes release of the two gonadotropic hormones, Luteinizing hormone and follicle stimulating hormone.
5. Prolactin inhibitory hormone (PIH), which causes inhibition of prolactin secretion.<sup>34</sup>

### **Hypothalamic Control of Endocrine Hormone secretion by the Anterior Pituitary Gland**

Stimulation of certain areas of the hypothalamus also causes the anterior pituitary gland to secrete its endocrine hormones. The anterior pituitary gland receives its blood supply mainly from blood that flows first through the lower part of the hypothalamus and then into the anterior pituitary vascular sinuses. As the blood courses through the hypothalamus before reaching the anterior pituitary, releasing and inhibitory hormones are secreted into the blood by various hypothalamic nuclei. These hormones are then transported in the blood to anterior pituitary, where they act on the glandular cells to control the release of the anterior pituitary hormones.

The cell bodies of the neurons that secrete these releasing and inhibitory hormones are located mainly in medial basal nuclei of hypothalamus, especially in the periventricular zone, the arcuate nucleus, and part of the ventromedial nucleus. The axons from these nuclei then project to the median eminence, which is an enlarged area of the pituitary stalk (infundibulum) where it arises from inferior border of the hypothalamus. It is here that the nerve terminals actually secrete their releasing and inhibitory hormones. These hormones are then absorbed into the blood capillaries in the median eminence and carried in the blood down along the stalk to the anterior pituitary vascular sinuses.<sup>35</sup>

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<sup>34</sup>Textbook of Medical Physiology Arthur C. Guyton, John E. Hall, Ninth Edition p926,935,936

<sup>35</sup>Textbook of Medical Physiology Arthur C. Guyton, John E. Hall, Ninth Edition p755

## **HYPOTHALAMIC-PITUITARY UNIT**

The hypothalamus is one of the most evolutionary conserved and essential regions of the mammalian brain. Indeed, the hypothalamus is the ultimate brain structure that allows mammals to maintain homeostasis, and destruction of the hypothalamus is not compatible with life. Hypothalamic control of homeostasis stems from the ability of this collection of neurons to orchestrate coordinated endocrine, autonomic, and behavioral responses. A key principle is that the hypothalamus receives sensory inputs from the external environment (e.g. light, pain, temperature, odorants) and information regarding the internal environment (e.g. blood pressure, blood osmolality, blood glucose levels). In addition, of particular relevance to neuroendocrine control, hormones (e.g. glucocorticoids, estrogen, testosterone, thyroid hormone) exert both negative and positive feedback directly on the hypothalamus.

The hypothalamus integrates diverse sensory and hormonal inputs and provides co-ordinated response through motor outputs to key regulatory sites. These include the anterior pituitary gland, posterior pituitary gland, cerebral cortex, premotor and motor neurons in the brain stem and spinal cord, and parasympathetic and sympathetic preganglionic neurons. The patterned hypothalamic outputs to these effector sites ultimately result in coordinated endocrine, behavioral, and autonomic responses that maintain homeostasis. The focus of this section, the hypothalamic-pituitary unit, is an exquisitely controlled system and underlies the ability of mammals to coordinate endocrine functions that are necessary for survival.

Gonadal, adrenal, and thyroid hormones, control of hormone synthesis is achieved by the homeostatic function of the hypothalamic pituitary axis. Cells in the hypothalamus and pituitary monitor the circulating hormone concentration and secrete tropic hormones, which activate specific pathways for hormone synthesis and release. Typical examples are luteinizing hormone, follicle-stimulating hormone, thyroid-

stimulating hormone, and adrenocorticotrophic hormone (LH, FSH, TSH, and ACTH respectively).<sup>36</sup>

### **Hypothalamus-Pituitary-Gonadal Axis**

The gonadal axis involves a complex interaction between hypothalamus, pituitary gland and the gonadas. The system works together to regulate development, reproduction, ageing and many other body processes. Its regulation relies upon a number of complex negative feedback loops which when lost result in disease.

#### **Male Gonadal axis**

1. The hypothalamus secretes GnRH.
2. GnRH travels down to the anterior pituitary gland.
3. It binds to receptors on the pituitary gland.
4. This causes release of LH (Luteinizing hormone) and FSH (Follicle Stimulating hormone).
5. LH and FSH travel in the blood stream to the testicles.
6. LH stimulates Leydig cell in the testicles to produce testosterone. Testosterone is required for spermatogenesis and many other biological processes.
7. FSH stimulates Sertoli cells to produce androgen binding globulin (ABG) and inhibin.  
ABG is a protein which binds to testosterone and keeps it within the seminiferous tubules. Inhibin helps to support spermatogenesis and inhibits production of LH, FSH and GnRH.
8. Increase levels of testosterone and inhibin cause negative feedback on the Pituitary and hypothalamus.
9. This results in decreased production of LH & FSH.
10. As a result production of testosterone and inhibin is also decreased.

#### **Female Gonadal axis**

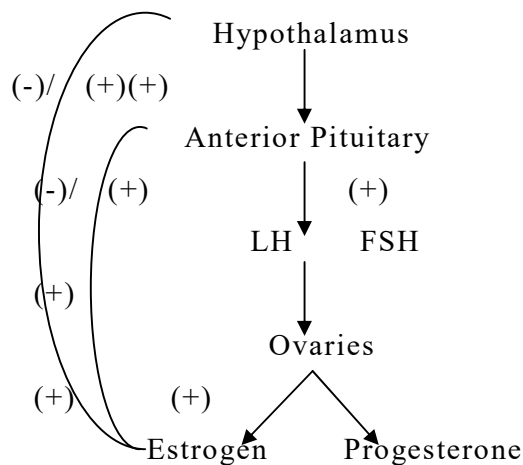
1. The hypothalamus secretes GnRH.
2. GnRH travels down to the anterior pituitary gland.

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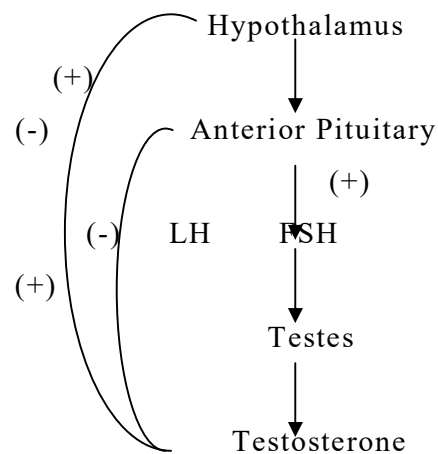
<sup>36</sup>Williams Textbook of Endocrinology Henry M. Kronenberg, Shlomo Melmed, Kenneth S. Polonsky, P. Reed Larsen Eleventh Edition p88,05

3. It binds to receptors on the pituitary gland.
4. This causes release of LH (Luteinizing hormone) and FSH (Follicle Stimulating hormone)
5. LH and FSH travel in the blood stream to the ovaries.
6. When LH and FSH bind to the ovaries they stimulate production of oestrogen and inhibin. Oestrogen helps to regulate the menstrual cycle.
- Inhibin causes inhibition of activin which is usually responsible for stimulating GnRH production.
7. Increasing level of oestrogen and inhibin cause negative feedback on the pituitary and hypothalamus.
8. This leads to decreased production of GnRH, LH and FSH.
9. This in turn results in decreased production of oestrogen and inhibin.<sup>37</sup>

#### Female HPG Axis



#### Male HPG Axis



Prolactin is a hormone also associated with causing perturbations in the gonadal axis. At either excessively low or high circulating levels, prolactin can result in suppression of testosterone levels in men. It has

<sup>37</sup><https://geekymedics.com> posted by Dr. Lewis Potter/ endocrinology

been speculated that the absence of prolactin at the testicle alters the effectiveness of LH to stimulate testosterone production.<sup>38</sup>

#### **Role of FSH and LH in men**

- FSH and LH bind to receptors in testis and stimulate testosterone production
- Stimulating testicular growth and production of protein that causes high local concentration of testosterone near the sperm, which is an essential factor in development of normal spermatogenesis
- FSH and LH are essential for the maturation of spermatozoa.

#### **FSH and LH in women**

- Controlling the development of ovarian follicles.
- Controlling the secretion of gonadal hormones from ovaries

#### **Role of oestrogen**

Present in both male and female but significantly higher levels in females of certain reproductive age.

#### **In males**

- Regulates certain functions of reproductive system important to the maturation of sperm and necessary for healthy libido beside other function.
- Regulates resorption of luminal fluid in the head of epididymis.
- Disruption of this essential function causes sperm to enter the epididymis diluted rather than concentrated resulting in infertility.

#### **In females**

- Promote development of breasts
- Involved in thickening of endometrium and other aspects of menstrual cycle
- Increase uterine growth
- Vaginal lubrication etc.

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<sup>38</sup>Williams Textbook of Endocrinology Henry M. Kronenberg, Shlomo Melmed, Kenneth S. Polonsky, P. Reed Larsen Eleventh Edition p1170

## **Androgens**

### **In females**

- Growth of pubic and axillary hairs at puberty
- Presence of androgens in ovary and granulosa cells is essential for normal follicle development and fertility. If normal androgen receptor signaling is blocked or eliminated in granulosa cells ovarian follicles cannot progress to later stages of development and leads to primary ovarian failure

### **In males**

- Responsible for masculine structures of males
- Responsible for libido fertility and sexual functions in males
- Helps in spermatogenesis

## **Progesterone**

- Opposes and balances effects of estrogen in both sex
- Raises level of androstenedione in the prostate gland in males
- Helps in preparation of endometrial bed in uterus for implantation and maintenance of fertilized ovum in females



## Stem cells

Stem cells are primitive cells that have potential to differentiate or develop into a variety of specific cell types. There are different types of stem cells based upon their origin and ability to differentiate 1.embryonic stem cell 2.fetal stem cell 3.adult stem cells 4.peripheral blood stem cells 5.umbilical cord stem cells 6.induced pluripotent stem cell.<sup>39</sup>

Stem cells are the biological cells which can be achieved from two sources; first embryonic (preimplantation) stem cells (ESCs) and stem cells that are found in somatic cells including in umbilical cord after birth(somatic stem cells or adult stem cells).

The stem cells are unspecialised cells that have two properties 1.the ability to differentiate into other cells and 2.the ability to self-regenerate for a long time. Zygote is the ultimate stem cell, but with its development it divides into different types of cells that can be totipotent, pluripotent, multipotent, oligopotent and so on till the cell is finally differentiated (nullipotent). Embryonic stem cells isolated from inner cell mass of blastocysts.

An adult stem cell is thought to be an undifferentiated cell, found among differentiated cells in mature tissue (including umbilical cord) or organ that can renew itself and can differentiate to yield some or all major specialized cell types of the tissue or organ where it has originated. They are far less in number and their plasticity (ability to differentiate into another type of cell) is observed not only under experimental conditions, but also in people who have received bone marrow transplants. However, they can not produce entire fetus under normal circumstances.

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<sup>39</sup> <http://www.medicinenet.com>main.art>

Regeneration capacity of stem cells should possess the functional criteria attributed to *Shukra* that is *Grabhotpadan* (reproduction), if it is correlated with *Sarva SharirvypiShukra*. But regeneration capacity of stem cells is not reproduction.

According to modern science, scientists are trying to establish relationship between bone marrow and sperms. After bone marrow transplant for acute leukemia recovery of spermatogenesis and successful conception was noted.<sup>40</sup>

Stem cells isolated from bone marrow of male volunteer in the lab. Stem cells are cultured and identified. Some induced to become spermstological cells which normally become sperm cells. These cells are transplanted into the testicle.<sup>41</sup>

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<sup>40</sup> <http://humrep.oxfordjournals.org/cgi/content/abstract/15/1183>

<sup>41</sup> [www.dhanwanriayurveda.com/articlesofayurveda](http://www.dhanwanriayurveda.com/articlesofayurveda)

## Prostaglandins-

Prostaglandins play a role in the following reproductive functions

1. Conception 2. luteolysis 3. menstruation 4. parturition.<sup>42</sup> It is one of a hormone like substances that participate in a wide range of body functions such as the contraction and relaxation of smooth muscle, the dilation and constriction of blood vessels, control of blood pressure and modulation of inflammation. Prostaglandins are derived from a chemical arachidonic acid.<sup>43</sup>

The following roles of prostaglandins in the reproductive process are discussed 1. Present in semen, they may aid in fertilization 2. They may function as mediators between luteinizing hormone and cyclic adenosine monophosphate (cAMP) during ovulation. 3. They may facilitate release of anterior pituitary hormone 4. they act to stimulate progesterone secretion 5. They act in some species as the uterine luteolytic hormone and 6. They sensitize the uterus to oxytocin during delivery. Since every body tissue appears to be able to synthesize prostaglandins, they also have other physiological functions.<sup>44</sup>7. The role of prostaglandins in the hypothalamic and pituitary control of gonadotropin secretions has shown to increase circulating levels of gonadotropins, adrenal cortex hormones, prolactin FSH and LH.<sup>45</sup>

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<sup>42</sup> Functions of prostaglandins-Review article Jones R L, Pathobiol Annu 1972- PubMed <https://www.ncbi.nlm.nih.gov/PumMed>

<sup>43</sup> [www.medicinenet.com](http://www.medicinenet.com)

<sup>44</sup> The Physiology of prostaglandins- Review article Poyser N L Clin Endocrinol Metab 1973

<sup>45</sup> Prostaglandins in hypothalamic pituitary and ovarian function- Review article Behrman H R Annu Rev Physiol 1979

## **Depression**

Depression is a mental health disorder characterized by persistently depressed mood or loss of interest in activities causing significant impairment in daily life.

Depression (major depressive disorder or clinical depression) is a common but serious mood disorder. It causes severe symptoms that affect how you feel, think, and handle daily activities, such as sleeping, eating, or working. To be diagnosed with depression, the symptoms must be present for at least two weeks..

### **Signs and Symptoms**

If you have been experiencing some of the following signs and symptoms most of the day, nearly every day, for at least two weeks, you may be suffering from depression:

- Persistent sad, anxious, or “empty” mood
- Feelings of hopelessness, or pessimism
- Irritability
- Feelings of guilt, worthlessness or helplessness
- Loss of interest or pleasure in hobbies and activities
- Decreased energy or fatigue
- Moving or talking more slowly
- Feeling restless or having trouble sitting still
- Difficulty concentrating, remembering or making decisions
- Difficulty sleeping, early-morning awakening or oversleeping
- Appetite and/or weight changes
- Thoughts of death or suicide or suicide attempts
- Aches or pains, headaches, cramps, or digestive problems without a clear physical cause and/or that do not ease even with treatment.<sup>46</sup>

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<sup>46</sup> <http://www.nimh.nih.gov/health/topics/depression/index.shtml>

## **Anxiety**

Anxiety is the mental health disorder characterized by feelings of worry, anxiety or fears that are enough to interfere with one's daily activities.

Occasional anxiety is a normal part of life. You might feel anxious when faced with a problem at work, before taking a test, or making an important decision. But anxiety disorders involve more than temporary worry or fear. For a person with an anxiety disorder, the anxiety does not go away and can get worse over time. The feelings can interfere with daily activities such as job performance, school work, and relationships. There are several different types of anxiety disorders. Examples include generalized anxiety disorder, panic disorder and social anxiety disorder. People with generalized anxiety disorder display excessive anxiety or worry for months and face several anxiety-related symptoms.

### **Generalized anxiety disorder symptoms include:**

- Restlessness or feeling wound-up or on edge
- Being easily fatigued
- Difficulty concentrating or having their minds go blank
- Irritability
- Muscle tension
- Difficulty controlling the worry
- Sleep problems (difficulty falling or staying asleep or restless, unsatisfying sleep).<sup>47</sup>

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<sup>47</sup> <http://www.nimh.nih.gov/health/topics/anxiety-disorder/index.shtml>

## Hamilton Anxiety Rating Scale (HAM-A)

The Hamilton Anxiety Rating Scale (HAM-A) is a psychological questionnaire used by clinicians to rate the severity of patient's anxiety. Though it is one of the first anxiety rating scales to be published, the HAM-A remains widely used by clinicians. It was originally published by Max R Hamilton in 1959.

The scale consists of 14 items designed to assess the severity of a patient's anxiety. Each of the 14 items contains a number of symptoms and each group of symptoms is rated on a scale zero to four, with four being the most severe. It measures both psychic anxiety (mental agitation and psychological distress) and somatic anxiety (physical complaints related to anxiety).

The Hamilton Anxiety Rating Scale is a clinician rated evaluation whose purpose is to analyze the severity of anxiety. The scale is intended for adults, adolescents and children and should take approximately ten to fifteen minutes to administer. The scale is public document. Since it is in the public domain. It is widely available for administration.<sup>48</sup>

Sum of the scores from all 14 parameters.<sup>49</sup>

14-17 Mild Anxiety

18-24 Moderate Anxiety

25-30 Severe Anxiety

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<sup>48</sup> [https://en.wikipedia.org/wiki/Hamilton\\_Anxiety\\_rating\\_scale](https://en.wikipedia.org/wiki/Hamilton_Anxiety_rating_scale)

<sup>49</sup> [www.assessmentpsychology.com/HAM-a\\_scoring.pdf](http://www.assessmentpsychology.com/HAM-a_scoring.pdf)

## ICD-10 for Depression

ICD-10 is the 10<sup>th</sup> revision of the International Statistical Classification of Diseases and Related Health Problems (ICD), a medical classification list by the World Health Organization (WHO). It contains codes for diseases, signs and symptoms, abnormal findings, complaints, social circumstances and external causes of injury or diseases. ICD-10 was endorsed in May 1990 by forty-third World Health Assembly.<sup>50</sup> Chapter V Block F00-F99 are related to Mental and behavioural disorders.

The major depression Inventory (MDI) is a self-report mood questionnaire developed by the World Health Organization. The instrument was constructed by a team led by Professor Per Bech, a psychiatrist based at Frederiksborg General Hospital in Denmark.

Each item is scored on a Likert scale from 0 to 5. To measure treatment outcome the sum of the ten items is used. When using the scale to diagnose depression according to ICD-10.

Mild depression - A score of 4 or 5 in two of the first three items. Plus a score of at least 3 on two or three of the last seven items.

Moderate depression - A score of 4 or 5 in two or three of the first three items. Plus a score of at least 3 on four of the last seven items.

Severe depression - A score of 4 or 5 in all of the first three items. Plus a score of at least 3 on five or more of the last seven items.<sup>51</sup>

This preliminary screening test does not replace in any way a formal psychiatric or psychological evaluation.

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<sup>50</sup> <https://en.m.wikipedia.org/wiki/ICD-10>

<sup>51</sup> [https://en.wikipedia.org/wiki/Major\\_depression\\_Inventory](https://en.wikipedia.org/wiki/Major_depression_Inventory)

## **Vigor Self Test**

The book “Vigor” 7 Days to Unlimited Energy, Focus and well-Being by Shawn M. Talbott, Ph.D, LND, FACSM. The material in this book is intended to provide a review of information regarding the effects of stress and hormone levels on health. This questionnaire has been used for several years to measure stress level and the degree of Metabolic Imbalance in reserach study subjects.

### Vigor Index

#### 0-5 points High vigor

Subjects are cool and have either a very low level of stress or a tremendous ability to deal effectively with incoming stressor.

#### 6-10 points Moderate (average) vigor

Subjects may be suffering from an over exposure to stress, an overactive stress response and are at moderate risk of having a chronic metabolic imbalance leading to reduced vigor.

#### Greater than 10 points Low vigor

Suffering from an overactive stress response, chronically disrupted metabolic balance and low state of vigor.<sup>52</sup>

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<sup>52</sup>Vigor 7 Days to Unlimited Energy, Focus & wellbeing by Shwan M Talbott, Ph.D,LDN,FACSM p



## Previous work done

Most of the work related to *Shukra Dhatu* is with reference to *Sthanik S hukra*. Several studies have been carried out on oligospermia which is co-related in research studies with *Kshina Shukra*, *Shukralapta*, *Shukra Dushti*, *Shukra Kshaya*, etc.<sup>53</sup>

Focus of all the studies is on *Beeja Swaroop* of *Shukra* (*Sthanikshukra*). In this study focus is on the *Dhatu Swaroop* of *Shukra* (*Sarvadehik Shukra*) and phenomenon of the *Sarvadehik* function of *Shukra* is studied.

- 1) Physiological study of “shukra dhatu” and clinical evaluation of “gudakushmand” in “shukralpta” w.s.r. to oligospermia National Institute of Ayurveda Jaipur 2011
- 2) Clinical study of Tribulus terrestris linn in oligospermia: A double blind study Thirunavukkarasu sellandi Anup B Thakar, Madhav singh Baghel Ayu 2012;33: 356-64
- 3) A clinical study on psychosomatic management of shukraavritta vata (premature ejaculation) with Rasayan yoga and shirodhara Basil carsozo, A B Thakar K P skandhan Ayu 2006;27:88-94
- 4) Shukradhatu ka vaigyanik Vivechan Das H.P. NIA Jaipur. 1992
- 5) A study on shukrasara purusha Bedar S.S. BHU Varansi. 1998
- 6) Study of reproductive tissue- Shukra Dhatu Dr. Vishwas V. Vayachal. 2007
- 7) Biotype and reproductive power in male Dr. Ramesh Gupta, Lucknow University. 1986
- 8) Comparative study of semen examination Pranav Govind Paranjape, Pune University. 2004
- 9) Clinical evaluation of indigenous Vrishya compounds in cases of oligospermia. Pandey S. D. State Ayurved College, Lucknow. 1990
- 10) Effect of Avipittikara ghruta in cases of shukra-alpata (oligospermia) Rai A. K State Ayurved College Lucknow. 1992

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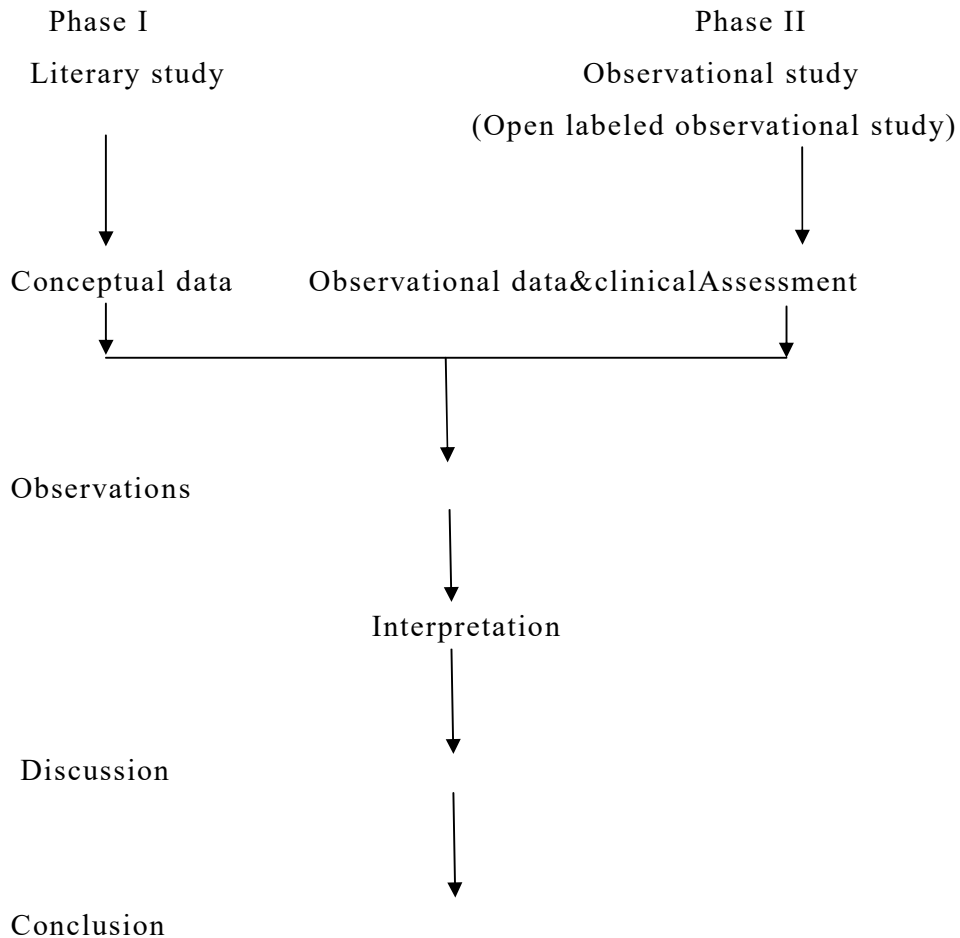
<sup>53</sup>Researches in Ayurveda Baghel M S, Jain G. k Jamnagar. Mridu Ayurveda Publication and sales 2005.

- 11) Role of vrisya yoga in the management of ksheena shukra (oligozoospermia) Thaker Anup B Gujarat Ayurved University Jamnagar. 1994
- 12) A clinical study on oligospermia (shukra kshaya) with its management by Vidarikanda Behra B. S. Gopabandu Ayurved Mahavidyalaya Utkal University, Bhubaneshwar Puri, 1996
- 13) A comparative study on the role of baladi Vrishya vasti and Shatavaryadi yoga in the management of Ksheena shukra w.s.r to oligozoospermia Ayyagiri R.S. Gujarat Ayurved Univerrrsity Jamnagar. 1998
- 14) Etiopathology of ksheena shukra (oligospermia) and its management with selected compound and Shuddha Shilajatu Gajjar D.R. I.P.G.T and R.A. Ahmedabad. 1998
- 15) A study on klaibya w.s.r.to Beejopaghata (oligospermia) and its management with Shatavari Pradhan A. Kumar Gopabandu Ayurved Mahavidyalaya Utkal University Bhuvaneshwar Puri. 1999
- 16) A clinical study on the role of Apatyakara vati in the management of vandhyatawa w.s.r to oligozoospermia Jayapala Singh P.G. govt. Akhandanand Ayurved College Gujarat Ayurved Univerrrsity Jamnagar. 2000
- 17) A clinical study of the effect of Shatavaryadi choorna in cases of oligospermia Tripathi S.K State Ayurved College, Lucknow 2002
- 18) A clinical study on ksheena shukra (oligospermia) w.s.r to Yapana basti and Shatavaryadi yoga Suresh Vyavahare HASS's Ayurved Mahavidyalaya Hubli, rajiv Gandhi university of Health Sciences. 2003
- 19) Comparative study with Mashadhi vati and Amalki bhavita Shilajatu in the management of Ksheena shukra (oligospermia) Joshi Kalpesh I.P.G.T and R.A Ahmedabad. 2005
- 20) Clinical management of Ksheena shukra (oligospermia) w.s.r to Ashwagandhadi and Shatavaryadi choorna – A comparative study Dr. Suhail Jandial Rajiv Gandhi Ayurved Mahavidyalaya Hubli,Rajiv Gandhi University of Health Sciences. 2010
- 21) Efficacy of Pushpadhanva Rasa on Kshina shura (oligospermia) Dr. Jitesh Padaria

- 22) Classification of shukra based on its doshic pre-dominance and semen. A Analytical study Dr. Bhavana K RRajiv Gandhi University of Health Sciences. www.rguhs.ac.in. 2004
- 23) Analysis of vanga bhashma and its clinical efficacy on ksheena shukra w.s.r to oligospermia Dr. Kalakappa S. Santoji. 2005
- 24) Aclinical Evaluation of effect of shukra shodhan Gana in the management of shukra Dushti via Teratozoospermia Dr. Ritesh Chawala
- 25) Role of Placebo and Psychological counseling in the management of shukragata vata w.s.r to Premature Ejaculation International J Ayur. Pharma Research journal 2013,1(3)47-53
- 26) Ph. D. thesis- A clinical study on the role of Ashvagandha in the management of kapaj shukra dushti Poojari Nagraja R Gujarat Ayurved University Jamnagar. 2005

**Methodology:**

**Study design- study protocol**



**Criteria for selection:**

Questionnaire was filled up by the subject. The subject in low vigor group, having Hamilton's rating scale above 14 and ICD-10 scale above 14 was enrolled into the study. Informed consent of all the subjects were taken.

**Criteria for Inclusion:**

1. Subject of both genders (male and female).
2. Age group 25 to 60 years.
3. Subjects in low vigor group.
4. Subjects having Hamilton's rating scale above 14.
5. Subjects having ICD-10 scale above 14.

**Criteria for Exclusion:**

1. Subject having infectious or contaminated diseases.  
e.g. syphilis, AIDS etc.
  2. Psychological disorders
  3. Reluctant to take medicine during the study
  4. Major illness or life threatening incidence happened during the study
- Sample size-** 100 subjects in low vigor group, Hamilton's rating scale above 14 and ICD-10 scale above 14 was enrolled into the study.

**Observational study:**

*Shukral karma of Ashwagandha (Withania Somnifera, Dunal)* was evaluated.

**Criteria for Assessment:**

- 1) Vigor index improvement.
- 2) Improvement in Hamilton's Rating Scale. (Scale below 14)
- 3) Improvement in ICD -10 scale. (scale below 14)
- 4) Clinical evaluation as per *Ayurvedic* Parameters.

Serial no.	Regimen	Particulars
1.	Name	Ashwagandha (withania s.)
2.	Form	Ashwagandha churna vati (250 mg each)
3.	Dose	2 gm/day
4.	Time	Rasayana kala- 1 gm (4vati) (in the morning) Udana kala- 1 gm (4vati) (at night)
5.	Anupan	Lukewarm water
6.	Route of administration	Oral
7.	Duration	One month
8.	Company	Atharva Ayurved Pharmaceutical, Wagholi, Pune.
9.	Container	4 bottles of 60 tab each

**Clinical Study:**

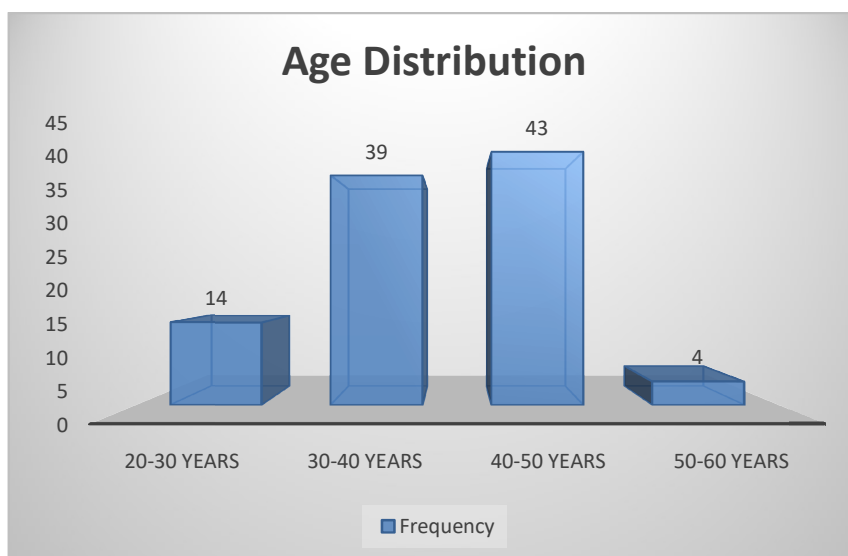
Each subject/ sample was evaluated as per the above mentioned scales of assessment.

**Place of work:**

General OPD of Hospital of the Institute where registered for this work.  
Follow up was taken after one month.

### Age wise distribution-

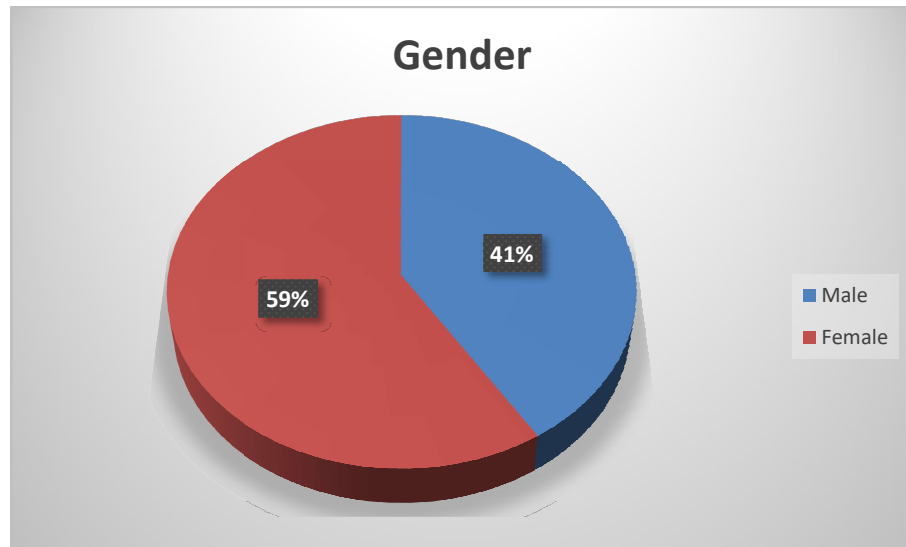
Age Group	Frequency	Percentage
20-30 Years	14	14
30-40 Years	39	39
40-50 Years	43	43
50-60 Years	4	4
<b>TOTAL</b>	<b>100</b>	<b>100</b>



Maximum subjects of age group 40-50 years were assessed.

### Gender wise distribution

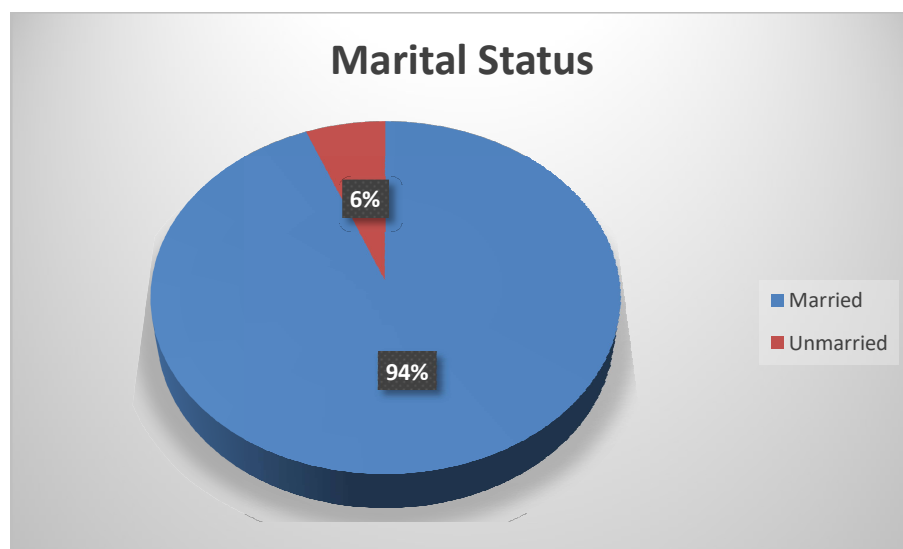
Gender	Frequency	Percentage
Male	41	41
Female	59	59
<b>TOTAL</b>	<b>100</b>	<b>100</b>



Numbers of female subjects were more than that of male subjects.

### Marital status

<b>Marital Status</b>	<b>Frequency</b>	<b>Percentage</b>
Married	94	94
Unmarried	6	6
<b>TOTAL</b>	<b>100</b>	<b>100</b>

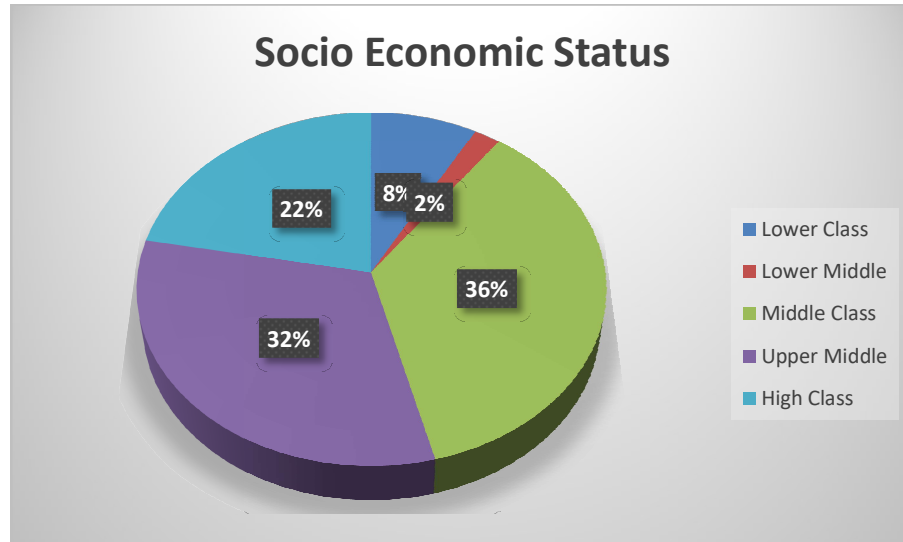


Married subjects were more than unmarried subjects in the study group.



### Socio-Economic status

SES	Frequency	Percentage
Lower Class	8	8
Lower Middle	2	2
Middle Class	36	36
Upper Middle	32	32
High Class	22	22
<b>TOTAL</b>	<b>100</b>	<b>100</b>

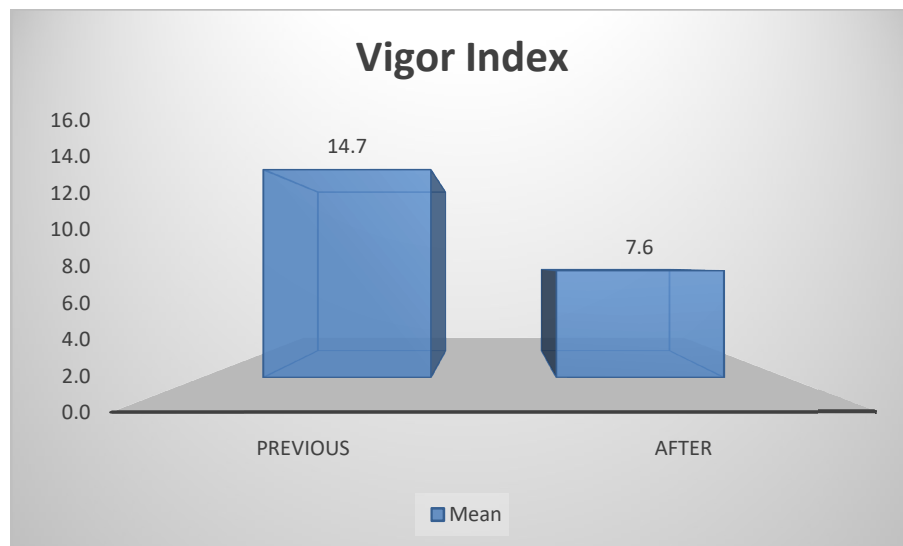


Socio-economically subjects in the group of middle and upper middle class were almost higher.

### Observation related to vigor Index

Vigor Index	Mean	N	SD	SE	Z-Value	P-Value	% Change
Previous	14.7	100	1.9	0.2	-17.541	0.000	48.6
After	7.6	100	2.0	0.2			

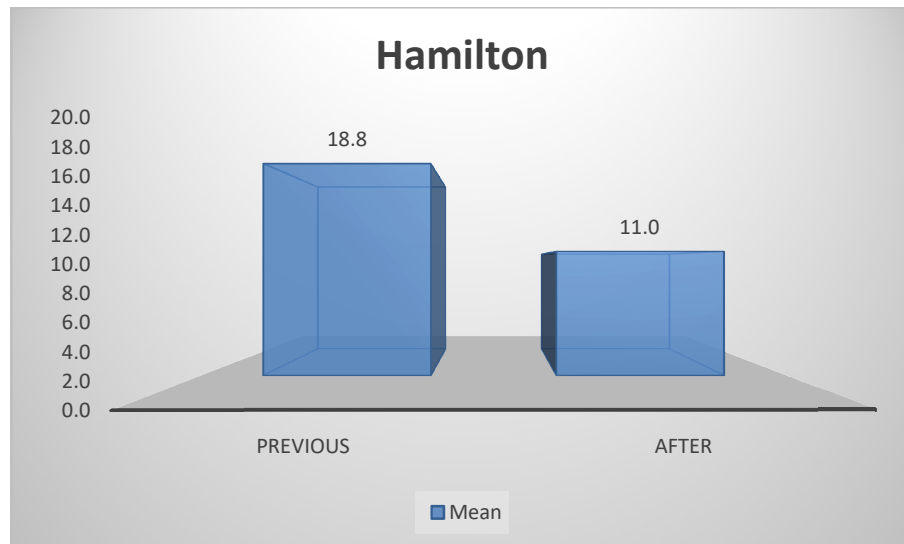
Since observations were quantitative and sample size was more than 30. We had used Z-test to test the significance. From above table we observed that P-Value was less than 0.05 hence we concluded that there was significant change observed.



### Observation related to Hamilton

Hamilton	Mean	N	SD	SE	Z-Value	P-Value	% Change
Previous	18.8	100	3.4	0.3	-17.099	0.000	41.4
After	11.0	100	2.6	0.3			

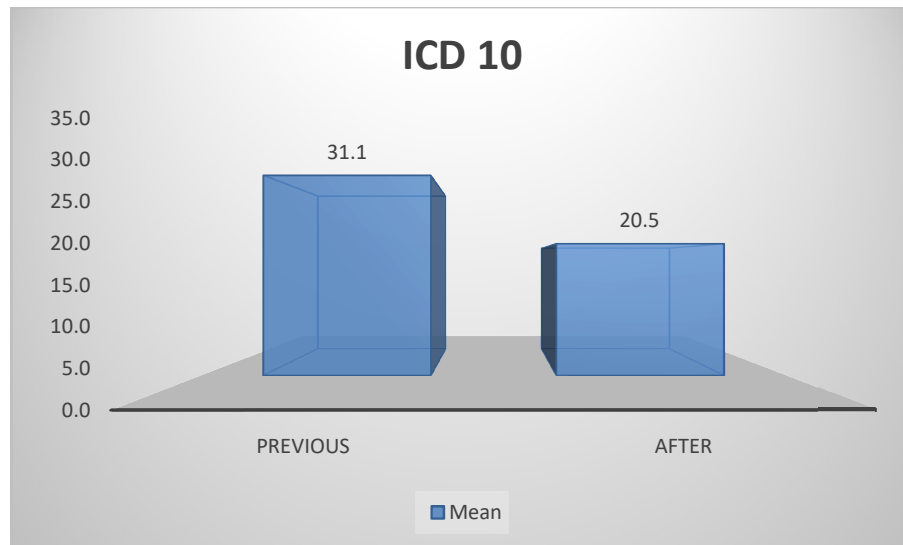
Since observations were quantitative and sample size was more than 30. We had used Z-test to test the significance. From above table we observed that P-Value was less than 0.05 hence we concluded that there was significant change observed.



### Observation related to ICD-10

ICD 10	Mean	N	SD	SE	Z-Value	P-Value	% Change
Previous	31.1	100	4.1	0.4	-16.819	0.000	34.1
After	20.5	100	3.6	0.4			

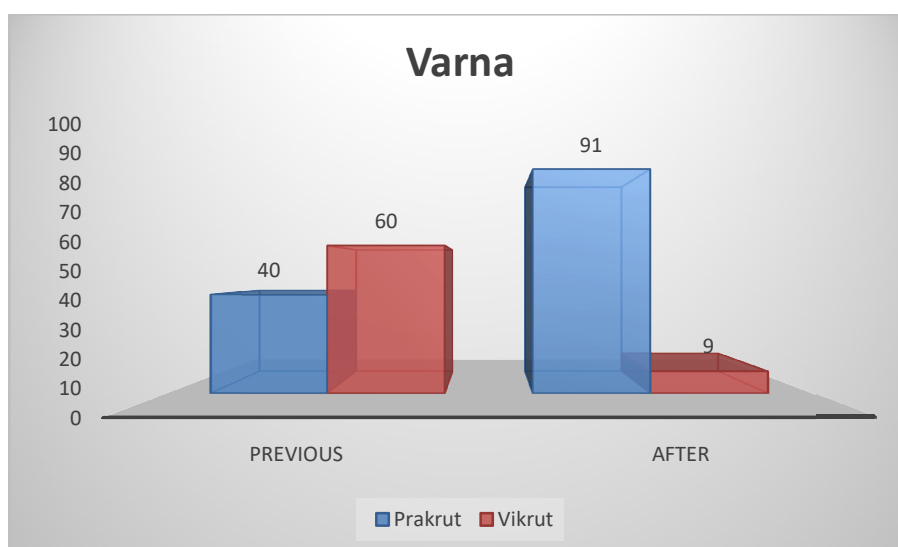
Since observations were quantitative and sample size was more than 30. We had used Z-test to test the significance. From above table we observed that P-Value was less than 0.05 hence we concluded that there was significant change observed.



**Observation related to *Ayurvedic* parameters**

**Observation related to *Varna***

Varna	Previous		After	
	Frequency	Percentage	Frequency	Percentage
Prakrut	40	40	91	91
Vikrut	60	60	9	9
TOTAL	100	100	100	100

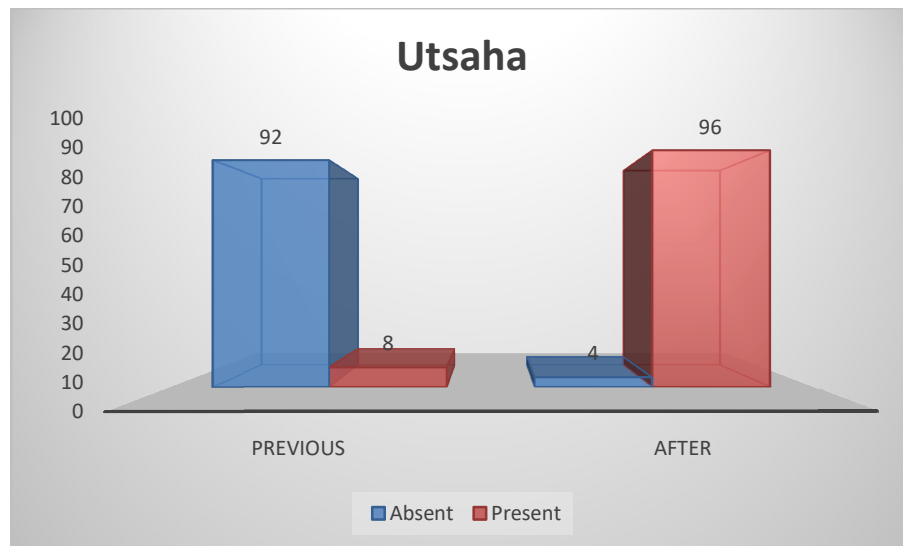


	Varna
N	100
McNemar	43.860
P-Value	0.000

Since observations were on nominal scale, with binary outcome. We had used McNemar's test to test the significance. From above table, we observed that P-Value was less than 0.05 hence we concluded that the change observed was significant.

### Observation related to *Utsaha*

Utsaha	Previous		After	
	Frequency	Percentage	Frequency	Percentage
Absent	92	92	4	4
Present	8	8	96	96
TOTAL	100	100	100	100

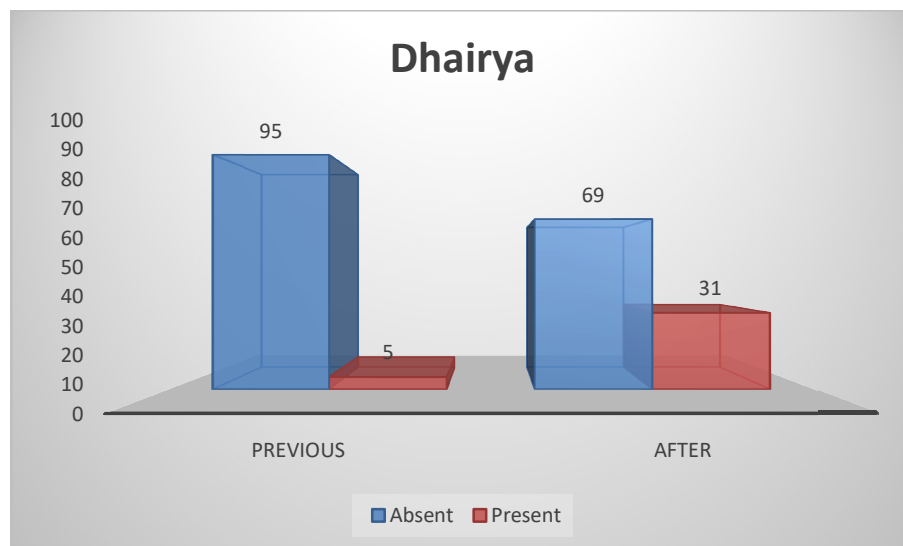


	Utsaha
N	100
McNemar	86.011
P-Value	0.000

Since observations were on nominal scale, with binary outcome. We had used McNemar's test to test the significance. From above table we observed that P-Value was less than 0.05 hence we concluded that change observed was significant.

### Observation related to *Dhairya*

Dhairya	Previous		After	
	Frequency	Percentage	Frequency	Percentage
Absent	95	95	69	69
Present	5	5	31	31
TOTAL	100	100	100	100

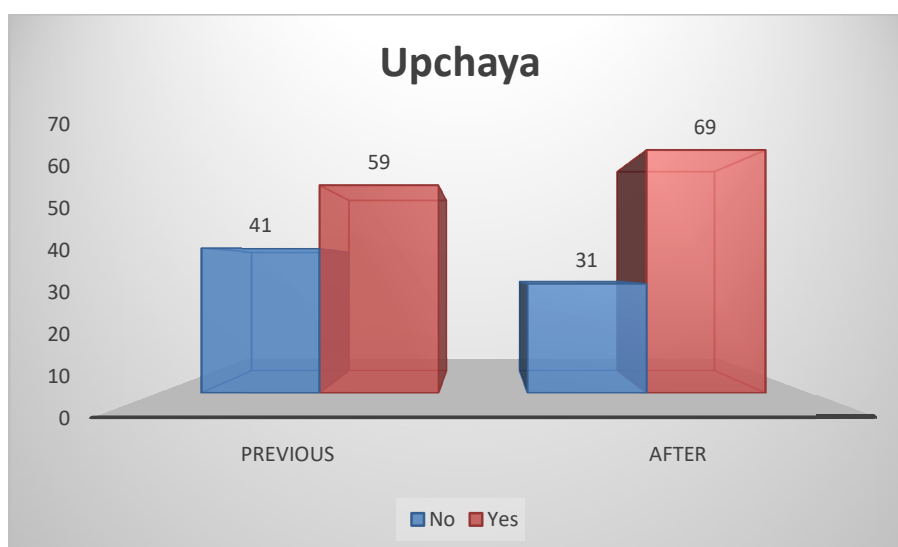


	Dhairya
N	100
McNemar	24.038
P-Value	0.000

Since observations were on nominal scale, with binary outcome. We had used McNemar's test to test the significance. From above table we observed that P-Value is less than 0.05 hence we conclude that change observed was significant.

### Observation related to *Upchaya*

Upchaya	Previous		After	
	Frequency	Percentage	Frequency	Percentage
No	41	41	31	31
Yes	59	59	69	69
TOTAL	100	100	100	100



	Upchaya
N	100
McNemar	9.550
P-Value	0.002

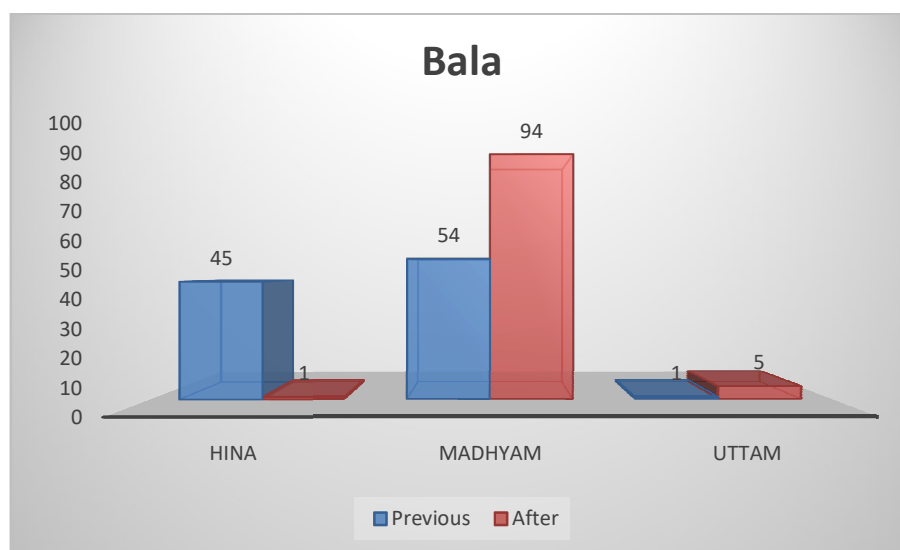
Since observations were on nominal scale, with binary outcome. We had used McNemar's test to test the significance. From above table we observed that P-Value is less than 0.05 hence we concluded that change observed was significant.



### Observations related to *Bala*

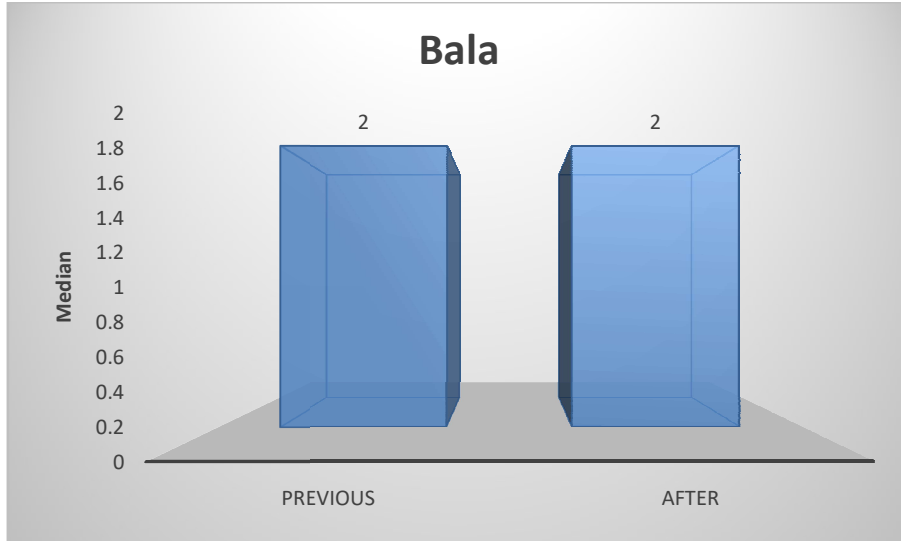
<b>Bala</b>	<b>Previous</b>		<b>After</b>	
	<b>Frequency</b>	<b>Percentage</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Hina</b>	45	45	1	1
<b>Madhyam</b>	54	54	94	94
<b>Uttam</b>	1	1	5	5
<b>TOTAL</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Previously *Bala* was *Hina* in 45 persons, *Madhyam* in 54 persons and *Uttam* in 1 person while after giving *Ashwagandha*(*Withania Somnifera*, *Dunal*) *Bala* was *Hina* in 1 Person, *Madhyam* in 94 persons and *Uttam* in 5 Persons.



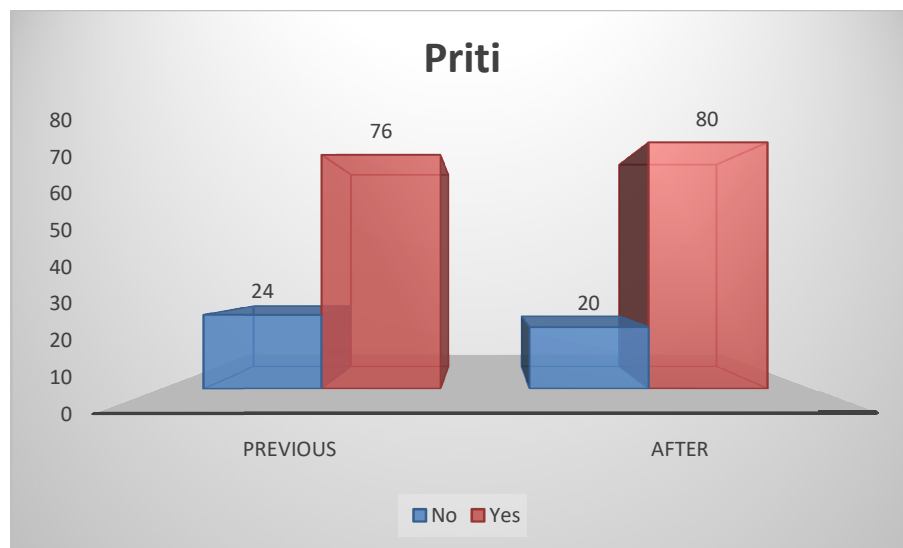
<b>Bala</b>	<b>Median</b>		<b>Wilcoxon Signed Rank W</b>	<b>P-Value</b>	<b>% Effect</b>	<b>Result</b>
	<b>Previous</b>	<b>After</b>				
	2	2	-6.928 <sup>a</sup>	0.000	30.8	Significant

Since observations were on ordinal scale, we had used Wilcoxon Signed Rank test to test efficacy. From above table we observed that P-Value was less than 0.05 hence we concluded that effect observed was significant.



**Observation related to *Priti***

<b>Priti</b>	<b>Previous</b>		<b>After</b>	
	<b>Frequency</b>	<b>Percentage</b>	<b>Frequency</b>	<b>Percentage</b>
No	24	24	20	20
Yes	76	76	80	80
<b>TOTAL</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>



	<b>Priti</b>
N	100
McNemar	2.354
P-Value	0.125

Since observations were on nominal scale, with binary outcome. We had used McNemar's test to test the significance. From above table we observed that P-Value is greater than 0.05 hence we concluded that change observed was not significant.

## Discussion-

*Shukra* is seventh dhatu in the body. It can be studied under to level 1) *Sarvadehika* and 2) *Sthanika shukra*. In this study focus is on the *Sarvadehika Shukra*. Reproduction is the function of the *Sthanika Shukra* but for the nourishment and production of the male and female *Beej* along with other functions of *Shukra Sarvadehik Shukra* is to be considered. *Bala* (physical and mental), *Upachaya*, *Utsaha*, *Varna*, *Dhairya* and *Priti* are other functions of *Shukra* which are reflecting in the entire body. These functions are governed by *Sarvadehika Shukra* and to analyzed these vigour test, Hamilton rating scale for anxiety and ICD-10 for depression is taken into consideration along with *Ayurvedic* parameters.

*Atichinta*, *Shoka*, *Krodha*, *Bhaya*, *Nidra*, *Ahar* (nourishment) etc. are the factors which affect the function of *Shukra Dhatu*.

अतीवचिन्तनाच्चैव शोकात्क्रोधद्भयातथा ॥  
ईर्ष्योत्कण्ठामदोद्वेगान् सदा विशति यो नरः।  
कृशो वा सेवते रूक्षमन्नपानं तथौषधम्॥  
दुर्बलोप्रकृतिश्चैव निराहरो भवेद्यदि।  
असात्म्यभोजनाच्चापि हृदये यो व्यवस्थितः॥  
रसः प्रधानधातुर्हि क्षीयेताशु ततो नृणाम्।  
रक्तादयश्च क्षीयते धातवस्तस्य देहिनः॥  
शुक्रावसानास्तेभ्योऽपि शुक्रं धामं परं मतम्।

च.चि ३०/१८१-१८५

So to evaluate the mental factors along with *Poshan* of the body and *Nidra* tests for vigor, anxiety and depression are taken into consideration.

*Ashwagandha* (*Withania Somnifera*, *Dunal*) is *Atishukral Dravya* according to *Bhavaprakash*. It stimulates immune system, increases

memory, acts as adaptogenic/anti-stress. As it is a sedative and nervine tonic it is useful in anxiety, depression. Withanolides found in the *Ashwagandha(Withania Somnifera, Dunal)* are thought to acts as hormonal precursors. Cortisol is the stress hormone which goes up during stress. Serum cortisol levels were substantially reduced due to *Ashwagandha(Withania Somnifera, Dunal)*. (Dr. Bongiorno)

Subjects having low vigor, Hamilton rating scale below 14 and ICD-10 scale below 14 of both genders are included into the study.

#### **Discussion about Vigor test -**

Vigor is defined as a 3-tired sustained mood state characterized by physical energy, emotional energy, and mental focus. In this questionnaire question are related to immune power, physical energy, mental energy, sleep and sex drive.

In vigor Index significant changed is observed. Improvement in physical energy is due to *Balya, Bruhana* and *Rasayan* properties of *Ashwagandha(Withania Somnifera, Dunal)*. Due to immuno-stimulatory activity it improves immune power of the subjects. It also increases energy, endurance, memory and helps to maintain general health and wellness. As an adaptogenic it helps to minimize stress related variation in diet and helps to encourage weight loss. As it is a sedative and nervine tonic it improves sleep in subjects. So 48.6% change is observed in vigour index.

#### **Discussion about Hamilton rating scale-**

It is for anxiety evaluation. Anxiety is the mental health disorder characterized by feelings of worry, anxiety, or fears that enough to interference with one's daily activities. Anxiety is associated with fatigue, tension, insomnia, irritation, restlessness etc. According to *Ayurveda* these all symptoms are associated with *Shukra Kshaya*<sup>54</sup> and *Oja Kshaya*.<sup>55</sup> Oja is formed from *Shukra Dhatu* as essence of all *Dhatu*. *Ashwagandha(Withania Somnifera, Dunal)* enhances *Ojas* which is dependent on *Saratva* of all *Dhatu*s especially *Shukra*. So subjects

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<sup>54</sup>Harita Samhita vaidya Jaymini Pandey Chaukhambha Vishvabharati Varanasi 1<sup>st</sup> edition 2010. Trutiyasthan 9/24-25

<sup>55</sup>Astangahrudaya sutrasthan 11/39-40.

suffering from anxiety get benefit from *Ashwagandha(Withania Somnifera, Dunal)*. The significant change is observed in this study and it is 41.4 %

### **Discussion about ICD-10 scale**

This scale is for depression. Depression is the mental health disorder characterized by persistently depressed mood or loss of interest in activities causing significant impairment in daily life. It is also associated with sleep, appetite, energy, concentration etc. As discussed previously functions of *Saravadehik Shukra* has concerned with mental health. As *Ashwagandha(Withania Somnifera, Dunal)* has antistress property along with sedative action it helps to improve mental health. It also acts as a nervine tonic and *Mastishkshamak*. It improves memory also.<sup>56</sup> So in this study significant change is observed and it is 34.1%.

According to *Ayurvedic* parameters to evaluate functions of *Sarvadehika Shukra Varna, Utsaha, Dhairya, Upachaya, Bala* and *Priti* factors are to be taken into consideration.

In the study among the 100 subjects, 60 subjects have *Vikruti* in *Varna* but after giving *Ashwagandha(Withania Somnifera, Dunal)*, 50 patients among 60 get significant result as *Ashwagandha(Withania Somnifera, Dunal)* is *Raktashodhak, Singdha* and *Madhur Gunatamka*.

*Utsaha* is absent in 96 subjects but after the study *Utsaha* is present in all 96 subjects. This significant result is due to *Mastikshkashamak* property of *Ashwagandha(Withania Somnifera, Dunal)*. As *Ashwagandha(Withania Somnifera, Dunal)* is *Rasayan, Balya, Vajikar* and anti-oxidant<sup>57</sup>, it increases energy and endurance of the subject. According to *Charakacharya, Utsaha* means mental strength (*Manaso Balam*).

सत्त्वं मनः मनसो बलं वा यत् उत्साह उच्यते। च.सू.११/३६

चक्रपाणि टिका

*Dhairya* is absent in 95 subjects but after taking *Ashwagandha(Withania Somnifera, Dunal)* improvement in 26 subjects is

<sup>56</sup> [http://w.w.wallayurveda.com/herb\\_mnoth\\_august11.asp](http://w.w.wallayurveda.com/herb_mnoth_august11.asp)

<sup>57</sup> Database on Medicinal Plants used in Ayurveda Vol 3 P.C. Sharma, M.B. Yelne, T.J. Dennis Central Council for Research in Ayurveda & Sidha, New Delhi 2001 pg91-92

seen. Due to *Rasayan* and *Vajikar* activity it promotes a youthful state of physical and mental health and expands happiness and effective in increasing stamina. Anti stress activity of *Ashwagandha* (*Withania Somnifera*, *Dunal*) reduces demand of cortisol hormone and produces more anabolic hormone like DHEA and testosterone.<sup>58</sup> *Dhairya* is dependent on the stable mind and as *Ashwagandha* (*Withania Somnifera*, *Dunal*) is *Mastishkashamak*<sup>59</sup> it has effect on *Dhairya*.

In 41 subjects, *upachaya* was not upto mark after introducing *Ashwagandha* (*Withania Somnifera*, *Dunal*); improvement in 10 subjects occurred. Due to *Deepana* and *Anulomana* it improves digestion which leads to well nourishment of the body. It increases body weight also. As an adaptogenic it helps to minimize stress related variation in diet and helps to encourage weight loss and maintain the body weight. *Madhur Ras* and *Bruhana* property of *Ashwagandha* (*Withania Somnifera*, *Dunal*) helps to improve *Upachay*.

*Bala washeena* in 45 subjects and *madhyam* in 54 subjects. After giving *Ashwagandha* (*Withania Somnifera*, *Dunal*), *Bala* was *madhyam* in 94 subjects and *uttam* in 05 subjects. *Bala* includes physical and mental strength. As *Ashwagandha* (*Withania Somnifera*, *Dunal*) is *Balya*, it gives inner strength and vitality and due to *Bruhana* it improves muscle bulk<sup>60</sup>. It helps to build muscle tissue, strength, promotes regeneration of tissues while enhancing mental vigor and vitality.

For *Varna*, *Utsaha*, *Bala*, *Dhairya* and *Upachaya* significant results were observed except for *Priti*. For *Priti* improvement was observed only in 04 subjects. *Priti* is of two types due to *Majja Dhatu* and due to *Shukra Dhatu*. *Priti* due to *Shukra Dhatu* is related to the affection towards the child (*Watsalya*, *Mamata* etc) and also the attraction of opposite sex. *Priti* due to *majja dhatu* is not due to sex attraction or for opposite sex but it is for the music, art, dance, literature, poetry etc and it is like love

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<sup>58</sup><https://ayurvedscience.com/articles/athletic-performance-enhancement-with-ayurveda-suppliments/>

<sup>59</sup>Database on Medicinal Plants used in Ayurveda Vol 3 P.C. Sharma, M.B. Yelne, T.J. Dennis Central Council for Research in Ayurveda & Sidha, New Delhi 2001 pg89.

<sup>60</sup><https://ayurvedscience.com/articles/athletic-performance-enhancement-with-ayurveda-suppliments/>

towards teachers (*Guru*).<sup>61</sup> So to evaluate *Priti* due to *Majja Dhatu* and *Priti* due to *Shukra Dhatu* different questionnaire may be needed.

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<sup>61</sup> Doshdhatumalavidnyan Vaidyratan G. A. Phadake, Vaidya Shri. G. Phadke edition 12<sup>th</sup> 1999 pg151.



### Discussion about *Shukra Dhatu*

- 1) Body is composed of seven *Dhatu*, *Shukra* is seventh *Dhatu* and situated in the entire body.
- 2) *Shukra* is present since childhood though it becomes predominate at puberty. It is invisible during childhood as fragrance hidden in the buds of the flower or fruit situated within flower.
- 3) *Shukra* is present within *Shukradhara Kala* and *Shukradhara Kala* is present all over the body. *Shukra Dhatu* and *Beeja Shukra* both are formed by *Shukradhara Kala*.
- 4) As a *Dhatu*, i.e basic form of the body tissue, *Shukra* is present in both male and female, which should be understood by its *Karmas*.
- 5) To clarify the knowledge, *Shukra* is explained into two categories  
a) *Sarvadehik Shukra* b) *Sthanik Shukra*
- 6) *Sarvadehik Shukra* is pervading throughout the body and *Sthanik Shukra* is semen (*Virya*) with seminal fluids in male and *Artva* in female.
- 7) Reproduction (*Navnirmitti*) is main function of *Shukra* which is due to *Sthanik Shukra*. But formation and nourishment of *Sthanik Shukra* is depending on *Sarvadehik Shukra*. *Dehabala*, *Utsaha*, *Dhairya*, *Harsha*, *Priti* are other functions of *Sarvadehik Shukra*.
- 8) *Charak* has explained that *Shukra Dhatu* is present in body just like juice is present in sugar cane, fat in milk and curd i.e its presence is not visible to naked eyes but it can be assessed through its functions.
- 9) The *Pramana* mentioned in classic is *Ardhanjali* could be of *Shukra dhatu* of whole body i.e *Sarvadehik Shukra*. In *Astang Hrudya Pramana* of *Shukra* is described as *Swa Prasrut* i.e 8 Tola=80 ml. *Pramana* of *Shukra* cannot be linked to quantity of semen.
- 10) *Stree Shukra* excreted during coitus is just secretion of bartholins, cervical and endometrial gland.
- 11) Entire endocrine orchestra especially Hypothalamic pituitary axis can be considered as *Sarvadehik Shukra*.

- 12) Prostaglandins are also present in every cell, it is local hormone synthesized in local tissues. It also play important role in reproduction, so it can be considered as *sarvdehik Shukra*.
- 13) Generation of *Shukra Dhatu* for purpose of reproduction takes place through Hypothalamus- pituitary gonadal axis i.e. spermatogenesis in male and oogenesis in female.
- 14) *Prajotpadan* is common in both but only mechanism of formation of *Beeja* differs in male and female, for *Beejartha* in male it is *Shukra* and in female it is *Artav*.
- 15) *Sushrut* has clearly mentioned that in one month *Shukra* in males and *artav* in females are produced. The meaning *artav* is *Stree Beeja* i.e *Sthanik Shukra* in female.
- 16) *Srotas* are circulating passages, which carry dhatus under going transformation. So the *Srotas* carry substances, which are supposed to be transformed into particular *Dhatus*. So it is clear that it is not the *Sarvadehik Shukra*, which circulates in the *Shukravaha Srotas*. It is *Shukra Beeja*.
- 17) *Charak* has described *Vrishana* and *Shepha* as *mulsthan* of *Shukravaha Srotas*. Among this *Vrishna* is responsible for the formation and storage of *Shukra* while *Shepha* is responsible for ejaculation of *Shukra*. The *Garbhotpatti* in female is due to *Artav* so we can take *Antahfala* (ovaries) in place of *Vrishana* and clitoris as *Shepha* which is modified penis.
- 18) While describing *Mulsthan* of *Srotas* it is not always *Srabhav sthan* of that *Dhatu* but sometimes it is *Vyaktisthan*, sometimes it is transporting the *Parinamapadyaman Dhatu*.
- 19) *Sushrut* has considered *Vrishana* and *Stana* as *mulsthan* of *Shukravaha Srotas*. Among these *vrishana* have clear role in the formation of *Beeja Shukra* in male and *Antahfala* in female. *Stana* is a sensitive area in sexual act and ultimate effect will be on the secretion of *Shukra* from the male and female genital secretions. This act has definite relation with *Shukra* and *Artav*.
- 20) *Vagbhat* has mentioned *Majja* as *mulasthan* of *Shukravah Srotas*. It may be to consider *mulasthan* as *Uttapattisthan* of *Sarvadehik*

*Shukra*. This may simply because of the hypothesis of *Ayurveda* that *Shukra Dhatu* is formed from *Majja Dhatu*. *Charak* has described that *Majja Sneha* is essential for the formation of *Shukra*.

- 21) *Shukra* is included in *Dasha Pranayatan*. Once it is accepted entire endocrine orchestra or substance responsible even for cell division it becomes *Pranayatan*.
- 22) *Shukra Dhatu* is formed from the *Majja Dhatu*. In adolescence the red bone marrow of long bones is converted to yellow bone marrow. The yellow bone marrow is an important source for the extra gonadal steroidogenesis which activates the hypothalamo-pituitary gonadal axis at the time of puberty.
- 23) Combined effect of extra gonadal steroidogenesis and entire group of endocrine hormones especially hypothalamic pituitary axis can be considered as *Sarvadehika Shukra*.
- 24) Among the all *Kalas* only *Shukradhara Kala* is spread in the entire body and *Sarvadehika Shukra* if equated with hormone is circulating through blood stream in the entire body and acts on targeted tissue or cells.
- 25) Cell regeneration is a very complex process and it includes cell multiplication also. Cell multiplication is of two type mitosis and meiosis. In cell multiplication hormone spermin proves important role.
- 26) Stem cells can be procured from embryonic stem cells and adult stem cells including umbilical cord stem cells. Zygote is the ultimate stem cell, with its development it divides into different types of cells. The reproduction criterion is attributed by the embryonic stem cells only. *Shukra* becomes functional at puberty, so zygote or embryonic stem cells are ruled out. Regeneration capacity of stem cells is not to be assumed as Reproduction. So that, adult stem cells does not carry out the function of reproduction (*Garbhotpadan*).

## CONCLUSION

1] *Sarvadehika Shukra* can be considered as the combined outcome of extra gonadal steroidogenesis.

2] Group of endocrine hormones - Growth hormones, and sex hormones along with hypothalamic pituitary gonadal axis, prostaglandins at various levels get activated during various stages of life i.e. from birth to senescence in human body. This complies with the concept of *Sarvadehika Shukra* as depicted by *Ayurveda*.

3] *Shukral Karma* of *Ashwagandha* (*Withania Somnifera*, *Dunal*) improves vigor index and reduces depression and anxiety. This also improves *Sarvadehika* functions of *ShukraDhatu* such as *Varna*, *Upachaya*, *utsaha*, *dhairya* and *bala* except *priti*. This proves reciprocally, that as per referred in the whole work, *Ashwagandha* (*Withania Somnifera*, *Dunal*) acts on *Sarvadehika Shukra* on a holistic basis.

Finally, it can be concluded that *Sarvadehika Shukra* encompasses every “*Paramanu*” of *Sharir* as quoted by *Vaishashika Darshana*.

## Scope for futher study

1. In classics *Uttapati* of *Shukra Dhatu* is mentioned from *Majja Dhatu*. At puberty red bone marrow of long bone is converted into yellow bone marrow which activates hypothalamus pituitary axis in initiating gonadal functions. So it is essential to study relation between *Majja Dhatu* and *Shukra Dhatu*.
2. Research on Stem cells from bone marrow will be done to find out whether they will be helpful for spermatogenesis and oogenesis (for the formation of *Beej Swaroop Shukra*)
3. Fuctions of *Sarvadehik Shukra* in subjects having disorders of endocrine system will be assessed to corelate hormones with *Sarvadehik Shukra*. The retrospective study will be done.

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# Tilak Maharashtra Vidyapeeth, Pune

Late P. G. Nanal Dept. Of Ayurveda

## Case Record Form For Ph.D

### STUDY OF SHUKRA DHATU WITH SPECIAL REFERENCE TO SARVADEHIK SHUKRA

#### Supervisor-

Dr. Mukund P. Erande  
Head of Department, Sharir Rachana  
S.S.Ayurved Mahavidyalaya,  
Hadapsar, Pune- 28.  
संमतिपत्र

#### Ph.D. Scholar-

Vda.Sumati S. Khot

नाव-

दिनांक-

जन्म तारीख-

वय-

१)मी हे निश्चित करतो/करते की सदर संशोधन प्रकल्पाबाबतची सम्पूर्ण माहिती मी वाचली असून मला समजली आहे त्याबद्दल मला प्रश्न विचारण्याची पूर्ण मुभा आहे.

२)सदर प्रकल्पाबाबत मी स्वेच्छेने सहभागी होत आहे व कोणतेही कारण न देता कधीही बाहेर पडण्याची मला मुभा आहे.माझी वैद्यकीय काळजी व कायदेशीर बाजू यावर कुठलेही परीणाम होणार नाहीत हे मला माहित आहे.

३)माझ्या वैद्यकीय तपासणीची कागदपत्रे बघण्याचा अधिकार मागण्याचे खालील घटकांना आता व भविष्यात देखील गरज नाही हे मला माहित आहे

अ) औषधां करिता आर्थिक मदत करणारे किंवा त्यांचे प्रतिनिधी

ब)इथिक्स कमिटी

क)संस्थाचालक

मी जरी सदर संशोधन प्रकल्पातून बाहेर पडले/पडलो तरी चालू प्रकल्पाकरिता किंवा पुढील संबंधित संशोधनाकरिता वैद्यकीय तपासण्यांची माहिती बघण्याबाबत व प्रसिद्ध करण्याबाबत माझी संमती आहे.यात माझी ओळख कुठेही देण्यात येणार नाही ह्याची मला कल्पना आहे.

४)सदर प्रकल्पातील माहिती, निष्कर्ष कुठेही वापरण्यास माझा निर्बंध नाही.त्याचा वापर फक्त वैज्ञानिक कारणासाठी व्हावा.

५)वरील संशोधन प्रकल्पात सहभागी होण्याची माझी संमती आहे.

सही/अंगठा

शोधकर्ता सही व नाव

साक्षीदार

सही व नाव उमोदवार/प्रतिनिधी

दिनांक

दिनांक

दिनांक

**Tilak Maharashtra Vidyapeeth, Pune**  
Late P. G. Nanal Dept. Of Ayurveda

**Case Record Form For Ph.D**

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**Supervisor-**

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Hadapsar, Pune- 28.

**Ph.D. Scholar-**

Vda. Sumati S. Khot

**Patient's consent Form**

**Study Number:** \_\_\_\_\_

**Date :** \_\_\_\_\_

**Subject's name:** \_\_\_\_\_

**Age:Sex:Occupation:** \_\_\_\_\_

1. I confirm that I have read and understood the information for the study and have had the opportunity to ask questions.
2. I understand that my participation in the study is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care, or legal rights being affected.
3. I understand that the sponsors of the clinical trial are working on the sponsor's behalf, the ethics committee and the regulatory authorities will not need my permission to look at my health records both in respect of the current study and any further research that may be conducted in relation to it, even if I withdraw from the trial. I agree to this access. However I understand that my identity will not be revealed in any information released to third parties or published.
4. I agree not to restrict the use of any data or result that arise from this study provided such a use is only for scientific purpose.
5. I agree to take part in the above study.

Signature or Thumb Impression  
Of the subject with date

Signature or Thumb Impression  
of the witness with date

Signature of the Investigator  
Name  
Date

Name of the patient: \_\_\_\_\_  
Name of the Physician: \_\_\_\_\_  
Name of the Institution : \_\_\_\_\_

### The Informed consent

I \_\_\_\_\_ have read the information in this form (or it has been read to me). I was free to ask any questions and they have been answered. I am over 18 years of age and exercising my free power of choice, hereby give my consent to be included as a patient for

“Study of shukra dhatu with special reference to sarvadehik shukra”

1. I have read and understood this consent form and the information provided to me.
2. I have had the consent document explained to me.
3. I have been explained about the nature of the treatment.
4. My responsibilities have been explained to me by investigator.
5. I have been advised about the risks associated with the treatment.
6. I have informed the physician of all the treatments I am taking or have taken in the past months(s) including allopath, Ayurved, homeopathic or any household treatments.
7. I agree to cooperate with the physician and I will inform him/her immediately if I suffer unusual symptoms.
8. My identity will be kept confidential if my data are publicly presented.
9. I have had my questions answered to my satisfaction regarding expected results as well as unwanted effects of the procedure(s).

By signing this consent from, I attest that the information given in this document has been clearly explained to me and apparently understood by me. I will be given a copy of this consent document.

Patient's sign: \_\_\_\_\_

Name: \_\_\_\_\_

—

Place: \_\_\_\_\_ Date: \_\_\_\_\_

Time: \_\_\_\_\_

Name: \_\_\_\_\_

**Tilak Maharashtra Vidyapeeth, Pune**  
**Late P. G. Nanal Dept. Of Ayurveda**

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Hadapsar, Pune- 28.

**Ph.D. Scholar-**

Vda. Sumati S. Khot

**Case record form**

**Patient name:** \_\_\_\_\_  
Address : \_\_\_\_\_  
\_\_\_\_\_

Contact No. : \_\_\_\_\_ Mobile: \_\_\_\_\_  
OPDNo. : \_\_\_\_\_ Age : \_\_\_\_\_ Sex: \_\_\_\_\_  
Caste : \_\_\_\_\_ Religion: \_\_\_\_\_  
Occupation : \_\_\_\_\_  
Desh : \_\_\_\_\_  
Kala: \_\_\_\_\_

**Vartaman vyadhi vrutta:**

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**Puraotapana Vyadhi:**

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**Puraotapana Vyadhi:**

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**Kulavrutta:**

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**Ashtavidha Pariksha:-**

1. Nadi:-

2. Mala: -

3. Mutra:-

4. Jihwa:-

5. Shabda:-

6. Sparsa:-

7. Drik:-

8. Akriti:-

**Sarvadehik Pariksha:**

Pulse:

BP:

Weight:

R R :

**Prakruti:** \_\_\_\_\_

**Agni:** \_\_\_\_\_

**Koshtha:** \_\_\_\_\_

**Indriya Pariksha:-**

**(a) Gyanendriya:-**

1.Shrotrendriya :

2.Rasanendriya :

3.Sparshnendriya :

4.Chakshurendriya :

5.Ghranendriya :

**(b) Karmendriya:-**

1.Vak :

2.Pani :

3.Pad :

4.Payu :

5.Upastha :



**Srotas Parikshana**

**Shukravaha:**

a.Mulasthan :

Vrushana :

Medhra :

Stana :

**Aartavvaha:**

a. Mulasthan :

Garbhashay :

Beejagranthi :

Aartavvahi dhamanya :

Yoni :

Rajah Pravrutti Itihas :

1. Pratham Rajodarshan :

2. Rajah Pravrutti : Niyamit / Aniyamit

3. Rajah Strav Swarup : Granthi (Adhik / Madhyam / Alpa)

4.Rajah Strav Varna : Aarakta / Krushnabha

5.Gandha : Durgandha / Avishesh / Vishistha

6.Rajah Stravache Dag :

7.Anartav / Alpartav / Kashtartav / Atyartav :

8.Rajah Strav kalin /purvi Lakshani :

Katishula,Prushthashula,Udarshula, etc

9.Manasik Lakshani :

**Saar parikshana:**

Shukrasaar:

Soumya	:		
Soumyapreshi	:	Ashti	}
Snigdha	:		
Ksheerpurnanetra	:	Nakha	
Samhat	:		
Praharshabahulatva	:	Danta	Shweta
Snigdhadanta	:		
Vruttadanta	:		
Saardanta	:		
Samhatdanta	:		
Saamdanta	:		
Shikhardanta	:		
Prasannavarna	:		
Snigdhavarna	:		
Prasannaswara	:		
Bhrajishnu	:		
Mahasphika	:		
Shukrasaarata	:		
Streepriya	:	Streepabhogi	:
Balwaan	:	Sukhabhangya	:
Vittabhajya	:	Aishwaryabhangya	:
<i>Arogyabhajya</i>	:	<i>Sanmanbhanga</i>	:
<i>Apatyabhajya</i>	:		



**B.S.D.T'S**

**Atharva Ayurved Pharmaceuticals, Wagholi, Pune**

Mfg. Lic. No. - PD/AYU -111

Ph. (020) 65101376, 20261364.

E mail: aapwagholi@gmail.com

**CERTIFICATE OF ANALYSIS**

**(Finished Product)**

**Name of Product** : Atharva Ashwagandha Choorna Vati  
**Batch no.** : PR01/13 **Batch Quantity** : 74400 Tab  
**Mfg. Date** : 03-2013 **Best before Dt** : 02-2016  
**Sampled Qty** : 100 tab x 4 **Sampling date** : 05/03/13  
**Analysis date** : 05/03/13 **Reporting date** : 05/03/13

S.N.	Test	Result	Specification
1.	Description	Cream colored, circular, compressed, biconvex, uncoated tablet. Taste; bitter.	Cream colored, circular, compressed, biconvex, uncoated tablet. Taste; bitter.
2.	Loss on drying	0.7254 %w/w	Not More Than 10 %w/w
3.	Average Weight	0.302	0.285 – 0.325 gm
4.	Diameter	10 mm	10 – 11 mm
5.	Thickness	4 mm	4-5 mm
6.	Hardness	3 kg/sq.cm	2-4 kg/sq.cm
7.	Disintegration Time	9 min	NMT 30 min
8.	Friability	0.2425 % w/w	NMT 1 % w/w

**Remark:** The above sample complies/Not complies as per IHS

*Sareels*  
**Analyzed by:**

*tequino*  
**Approved by:**

Name: \_\_\_\_\_

Place: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Questionnaire

**Vigor test**

Questions- How often Do You \_\_\_\_\_

Q.No	Question	0	1	2
1	Experience stressful situations?			
2	Feel tired or fatigued?			
3	Get less than eight hours of sleep?			
4	Feel anxious /depressed?			
5	Feel overwhelmed or confused?			
6	Have a low sex drive?			
7	Put on weight around the belly?			
8	Diet to lose weight?			
9	Attempt to control your body weight?			
10	Pay close attention to foods you eat?			
11	Crave carbohydrates (sweets or breads)?			
12	Experience problems concentrating?			
13	Experience tension headaches?			
14	Experience digestive problems or heartburn?			
15	Get sick or catch colds/flu?			
	Total of score of above 15 questions =			

Question- How often do You Feel

Q.No	Question	Yes / No	Score
16	Lively		
	Active		
	Energetic		
	Cheerful		
	Alert		
	Full of pep		
	Carefree		
	Vigorous		

Vigor Index	
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Name: \_\_\_\_\_

Place: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

### Hamilton Rating Scale

Item			Rating
1.	Anxious	Worries, Anticipation of the worst, Fearful anticipation, Irritability	
2	Tension	Feelings of tension, fatigability, startle response, moved to tears easily, trembling, feelings of restlessness, inability to relax	
3	Fears	Of dark, of strangers, of being left alone, of animals, of traffic, of crowds	
4	Insomnia	Difficulty in falling asleep, broken sleep, unsatisfying sleep and fatigue on waking, dreams, nightmares, night terrors	
5	Intellectual	Difficulty in concentration, poor memory	
6	Depressed mood	Lack of interest, Lack of pleasure in hobbies, depression, early waking, diurnal swing	
7	Somatic (muscular)	Pains and aches, twitching, stiffness, myoclonic jerks, grinding of teeth, unsteady voice, increased muscular tone	
8	Somatic (Sensory)	Tinnitus, blurring of vision, hot and cold flushes, feelings of weakness, pricking sensation	
9	Cardiovascular Symptoms	Tachycardia, palpitations, pain in chest, throbbing of vessels, fainting feelings, missing beats	
10	Respiratory Symptoms	Pressure or constriction in chest, choking feeling, sighing, dyspnea	
11	Gastro-intestinal symptoms	Difficulty in swallowing, wind, abdominal pain, burning sensation, abdominal fullness, nausea, vomiting, borborygmi, looseness of bowels, loss of weight, constipation	
12	Genito urinary Symptoms	Frequency of micturation, urgency of micturation, amenorrhea, menorrhagia, development of frigidity, premature ejaculation, loss of libido, impotence	
13	Autonomic symptoms	Dry mouth, flushing, pallor, tendency to sweat, giddiness, tension headache, raising of hair	
14	Behavior at interview	Fidgeting, restlessness or pacing, tremors of hand, furrowed brow, strained face, sighing or sighing respiration, facial pallor, swallowing, belching, brisk tendon jerks, dilated pupils, exophthalmos	
		TOTAL	

Name: \_\_\_\_\_

Place: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

**ICD – 10**

	<b>How much of the time</b>	<b>All of the time</b>	<b>Most of the time</b>	<b>More than half of the time</b>	<b>Less than half of the time</b>	<b>Some of the time</b>	<b>At no time</b>
1	Have you felt in low spirits or sad?						
2	Have you lost interest in your daily activities?						
3	Have you felt lacking in energy or strength?						
4	Have you felt less self confident?						
5	Have you had a bad conscience or feeling of guilt?						
6	Have you felt that life wasn't worth living?						
7	Have you had difficulty in concentrating, e.g. when reading the newspaper or watching television?						
8a	Have you felt very restless?						
8b	Have you felt subdued?						
9	Have you had trouble sleeping at night?						
10a	Have you suffered from reduced appetite?						
10b	Have you suffered from increased appetite?						

Name: \_\_\_\_\_

Place: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

### **Ayurvedic Parameters for Clinical Assessment**

- 1) Varna : Prakrut ( ) Vikrut ( )
- 2) Utsaha : Present ( ) Absent ( )
- 3) Dhairya : Present ( ) Absent ( )
- 4) Upachaya : Yes ( ) No ( )
- 5) Bala : Uttama ( ) Madhyam ( ) Hina ( )
- 6) Priti : Yes ( ) No ( )