



GENETICS AND HEREDITY THROUGH AYURVEDA SAMHITAS

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ABSTRACT

Understanding Genetics and Heredity through the kaleidoscope of Ayurveda enables *Vaidyas* to realise the merits of preventive measures required in planning a *swasthakutumba* and thereby building a *swasthasamaja*. Science of Genetics and Heredity is creating revolutionary waves across the globe with the development of technology and evidence-based medicine. Adequately training our practitioners to deal with the diagnosis & management of these disorders is the need of the hour. For preventive measures, the right diagnosis is mandatory, and for the latter, *dosha-dushya sammurchana* should be assessed. *Acharyas* have mentioned *dushti* of *beeja*, *beejabhaga* or *beejabhaga-avayava*, invariably having repercussions on offspring. *Shareera Sthana*, dedicated exclusively to *garbha sambhava* and *vikasa*, is thus a foundation in this sector. A faithful and comprehensive approach to the *rachanatmaka shareera* from the beginning is mandatory. Therefore, a retrospective study of Rachana Shareera for a deeper insight into Genetics in Ayurveda is attempted.

MATERIALS AND METHODS

Relevant *Samhitas* were screened for critical literary review of the references regarding *garbha paricharya*, several articles from indexed journals, PubMed, and other textbooks were also used to acquire information regarding genetics, heredity, and related disorders.

Keywords: Beejabhaga, Garbhadana, Atulyagotra, Charya

INTRODUCTION

Being one of the oldest health sciences in the world, Ayurveda is rooted in various indigenous approaches to the latest principles of medicine. Genetics and its discoveries created and still are upshots in medicine due to its massive impact on “long life”. Charaka, Susruta and Vagbhata pioneering in *Shareera Sthana* have rave contributions in the foundation of these aspects. Ayurveda explains unique concepts of *shareerika evum manasika prakriti, beeja-beejabhaga* and *beejabhaga-avayava, prakruti-vikruti, aadibala pravrutta and janmabala pravrutta vyadhi* among others. Throwing light into these basic principles helps us in various ways, including advanced research and evidence-based approaches.

Living beings bearing and reproducing the same species as them, the transmission of ideas and information to a child from its parents, and children resembling their antecedents were some of the theories, rather “beliefs”, which led to the quest in man regarding heredity. However, many of these theories remained so due to the lack of a systematic approach. Aristotle, often referred to as father of biology, was one of the first luminaries to postulate genetics and heredity theories. But to our astonishment, much of these can be found in our *samhitas*. To analyse, some examples can be taken such as:

a) **A thing generates each being in the same name. For eg: a man is generated**

by a man, a horse by a horse

b) **The father and mother are principles of generation, the father supplies**

the principle of form, whereas the mother supplies the principle of matter.¹

When Agnivesha enquires regarding the various factors influencing the birth of a child and its similarities to its parents, an example is given by Acharya Atreya saying, “*Yatha gau gaurprabhavah yatha cha ashvo ashvaprabhava iti, manushyascha manushyaprabhava uchyate.*²” He also enlists the *shareerikabhavas* inherited from *maatah, pitaah, saathmya* etc.

GARBHA VIKRUTI

Vikruti, also called *vikara or roga*³, is an abnormal state consequent to any *doshadhatwadi pradushti*. *Garbhavikruti* is considered under the spectrum of genetic or congenital disorders, which can occur due to many reasons like:-

- *Shukra – aartavadushti*
- *Ashayadushti*
- *Asamyoga of aatma*
- *Kaaladushti*⁴

Many examples of *vikruti*, namely *kubja, kuni, pangu, mookatva, minminatva* and *vaamanatva*, are enlisted, which, when analysed, are mostly *vataja nanatmaja vikaras*. Kashyapa in *Lehanadhyaya* points out the importance of an early diagnosis and religious monitoring and management of these conditions in references like *Samvardhana ghritha*. *Vatavyadhi chikitsa adhikara* of other authors also mention *taila-ghrita prakarana* for the conditions. Even then, a vast elucidation of preventive angles of *garbhavikara* is conspicuous in our science.

Acharya Sushruta defines *deerghayu* as

Goodasandhisirasnayu samhatanga shirendriyah | Uttarottarasukshetro yah sa deerghayuruchyate ||

“An able-bodied person with the proportionate disposition of *sandhi-sira-snaayu* and structures alike with the sharpness of sensory faculties and endearing bodily features”.

As a *paathanthara* to *uttarottara sukshetra*, Chakrapani quotes *uttarottara deerghayu purusha kule jaata*, i.e. having a solid lineage as the primary step to a healthy progeny based on which several principles and practices are elaborated in our *samhitas*.

Each Principle Explained

I. ATULYAGOTREYAM

Atulyagotreeya is one of the earliest references regarding the preventive approach to genetic and hereditary disorders. *Atulya* means unequal (*Na tulya*). *Gotra* refers to the lineage one belongs to. Atreya advises one not to marry a person of the same *gotra*.

This is considered as *Adharma (dharma shaastreshu nishiddhatwaat⁵)*. This beautifully underlines the preventive aspects of genetic or hereditary disorders. Consanguinity is still a prevailing condition in India, and as per recent surveys, the prevalence rate is 9.9%.

Kashyapa, too, mentions *asamanagotra⁶* as an important factor for *supraja*. Marrying from different *gotras* helps acquire the qualities of 2 different lineages and avoid any kind of hereditary disorder.

II. MAATRUJADI SHAD BHAVAS

One of the distinctive concepts in our *Samhitas*, *Maatrujadi Shadbhavas*, is the contributions of *malta, pita, aatma, satwa, saathmya, and rasa⁷* to the formation of a *garbha*.

a. Maatruja bhava

Maatrujaschayam garbha| Na hi maturvina garbhotpatti syat, na cha janma jaraayujaanam| Yani khalu asya garbhasya maatrujani, yani chasya matrutah sambhavatah sambhavanti, tani anuvyakhyasyamah; tadyatha- twak cha, lohita cha, mamsam cha, medascha, nabhischa, hridayam cha, kloma cha, yakrutcha pleeha cha vrukkau cha bastischa, purishadhanam cha, amashayascha, pakwashayascha, uttaragudam cha adharagudam cha kshudrantram cha sthoolantram cha vapa cha vapavahanam cheti (maatrujani)||6|| Cha.Sha.3/6 Here the internal organs are named one by one like *hridaya, kloma, yakrut* etc along with skin and blood factors. If we analyse, the *koshtangas* explained by Charaka are enlisted among *maatrujadi bhava* which clues the maternal contribution in organogenesis. For example: *hridayam* is *shonitha kapha prasaadajam, kloma api shonitajam, yakrut-pleehanou shonitajau⁹*

b. Pitruja bhava

Pitrujaschayam garbhah- Na hi pitru rute garbhotpatti syaat, na cha janma jaraayujaanam. Yaani khalu asya garbhasya pitrujaani, yani chasya pitrutah sambhavatah sambhavanti, taani anuvyakhyasyamah; tadyatha – keshha, shmashru, nakha, loma, danta, asthi, sira, snayu, dhamanyah, shukram cheti pitrujani ||7|| Cha.Sha.3/7

The paternal factors are mostly hard and/or compact in nature, namely the bones, cartilages, hair, teeth, body hairs, neurovascular structures, and the *shukra*.

c. Aatmaja bhava

Aatmajasya ayam garbhah- Yani tu khalvasya garbhasya aatmajani yani chasya aatmatah sambhavatah sambhavanti, tani anuvyakhyasyamah; tadyatha – taasu taasu yonishu utpatti, aayu, aatmajnaanam, manah, indriyani, prana-apaanau, preranam, dhaaranam, aakruti, swaravarnavishesha, sukha-dukhe, iccha-dweshau, chetana, dhriti, buddhi, smriti, ahankara, prayatnascheti (Aatmajani)||10|| Cha.Sha.3/10

Aatmajabhavas are the ones formed with *sannikarsha* of *aatma*. As *aatma* is *nirvikara*, it cannot generate a new thing, thus we see *aatmasannikarsha* here. The factors derived here are specification of species, longevity, self-knowledge, mind, sense organs, inspiration-expiration, a driving force, sustenance, voice and complexion, happiness and misery, desire and aversion, consciousness, self-command, intellect, memory, ego and endeavour.

d. Saathmyaja bhava

Saathmyajaschayam garbhah- |Yani tu khalvasya garbhasya saathmyajani yani chasya saathmyatah sambhavatah sambhavanti, tani anuvyakhyasyamah; tadyatha- aarogyam anaalasyam alolupatvam indriyaprasaadah swara-varna-beeja-sampad praharsha bhuyastwam cheti (saathmyajani) ||11|| Cha.Sha.3/11

Saatmya is the factor that enables *shukra* and *shonita* to be capable for *garbha* formation. The practice of *saatmya aahara-vihara kramas* strengthens *shukra-shonita* and *garbhashaya* for procreation. However, *saatmya* alone can only achieve this with *aatma*, hence the importance of *samudaaya*. The *saatmya bhavas* derived are freedom from illness, laziness and desires, proper functioning of sense organs, excellence of voice, complexion (influenced by *aatma* factor), reproductive aspects and adequate carnal pleasure.

e. Rasaja bhava

Rasajaschayam garbhah- Yani tu khalvasya garbhasya rasajani yani chasya rasatah sam-

bhavatah sambhavanti, tani anuvyakhyaasyamah; tadyatha- shareerasya abhinirvrutti ,abhivruddhi, pranandbandha, trupti, pushti utsaahascha iti (rasa-jani) ||12|| Cha.Sha.3/12

The *rasajabhavas* carry out the growth and development of the *garbha* by providing nourishment. This is facilitated through *garbha nabhinaadi*, which connects the *garbha* with the mother and is accomplished by the process of *upasneha* and *upasweda*. The unfolding of the different *anga-pratyangas*, the linear and circumferential growth, amiable disposition, and vitality of the developing *garbha* evolved from *rasa*.

f. Satwaja bhava

Yani khalu asya garbhasya satwajani, yani chasya satwatah sambhavatah sambhavanti, tani anuvyakhyaasyamah; tadyatha – bhakti, sheelam, shoucham, dwesha, smriti, moha, tyago, matsaryam, shouryam, bhayam, krodha, tandra, utsaha, taikshnyam, mardavam, gambhiryam, anavasthithvam, iti evam aadayaschanye, te satwavikara yan uttarakalam satwabhedam adhikrutya upad-ekshyamah|| Cha.Sha.3/13

Satwa/Mana is the factor which unites *jeevatma* with *aupapaadika (bhogayatana) shareera* . This *satwa*, as Charaka explains, is *nanaividha (saatwitka, rajasika, tamasika)*⁹, present in every individual, although not simultaneously & periodically exhibiting their attributes in day-to-day life. Right from *garbhavaastha*, these *satwaja bhavas* imbibed include virtuous qualities like *bhakti-sheela-shoucha-smriti-tyaaga-utsaaha-maardavam-gaambheeryam*, aggressive qualities like *dwesha-matsarya-shourya-krodha-taikshnya*; abominable qualities like *mohatandra-anavasthitatwam* etc. All these factors are undoubtedly inherited from parents, as *prakruti* is

a) Ritumati charya

The prosperous couple should observe *Brahmacharya* before the *ritukaala* commences. Dalhana explains this practice to aid *vishishta prajaa utpadana*. Since the first day of *ritukaala*, the *ritumati* should avoid certain practices that could potentially harm the *garbha*. Those are:

constituted during *shukra-shonita samyoga*. This reinstates that parents’ mental well-being throughout their life, during the planning of a family and at the moment of copulation, is very crucial.

III. PRAKRUTI

Prakruti is the unique physical & mental make-up of each individual. What we say lamely as the character of an individual is *prakruti*. It makes each one of us different. *Prakruti* is the basis of *chikitsa* in our science, and the *udbhava* of *prakruti* was suitable at conception. The factors responsible for *prakruti* formation are, once again, the *shukra* and *shonita*. The different permutations and combinations of *dosha* during *Shukra-shonitasamyoga*¹⁰ make the “*prakruti*”. *Acharyas* explains *prakruti* at two levels: *Shareerika* and *Manasika*. In *shareerika prakruti*, *ekadoshaja*, *dwidoshaja* and *tridoshaja prakruti* are presented by which even an individual’s longevity can be assessed. *Manasika prakruti* includes *Saatwika, Rajasika & Tamasika* traits.

IV. GARBHADANA CHARYA

A *garbha* is the result of well-thought-out and disciplined planning. Back then, Planned Parenthood was given paramount concern to have a healthy progeny, which indeed started right after the girl child attained womanhood. A woman, designed blessedly by the creator to bear another life, is given utmost importance throughout her reproductive age. These procedures are collectively called *garbhadana charya*, which again emphasises the precautions required to ensure healthy progeny. Among these, *Ritumati charya*¹¹, the first one is practiced during the *ritukala* for the sake of *suputra*. *Acharya Dalhana* calls it *putreeyam*¹¹.

KARMA	DOSHA
Divaswapna	Swapasheela
Anjana	Andha

<i>Ashrupaata</i>	<i>Vikrutadrishti</i>
<i>Snana</i>	<i>Dukhasheela</i>
<i>Anulepana</i>	
<i>Abhyanga</i>	<i>Kushta</i>
<i>Nakhacheda</i>	<i>Kunakha</i>
<i>Pradhavana</i>	<i>Chanchala</i>
<i>Hasana</i>	<i>Shyavadanta</i>
<i>Kathana</i>	<i>Pralaapi</i>
<i>Atishabdashravana</i>	<i>Badhira</i>
<i>Avalekhana</i>	<i>Khalati</i>
<i>Anila</i>	<i>Unmada</i>
<i>Aayasa</i>	

These activities during *ritumati avastha* have a high propensity to adversely affect the *apaana vaayu*, which in turn interferes with the complete expulsion of the *sanchita aartava*, resulting in the *dushti* of *aartava* that gets ready in its next cycle. In other words, it ends up in *beejabhaaga avayava dushti*. Sleeping on *darbha shayya* and eating/drinking from a *mrit paatra* enables balancing the *pitta dosha*, which is *prakupita* during *ritukaala*. After three days of abstinence, on the 4th day, *ritumati* is advised to see her spouse because the emotional feeling of the woman towards her partner bears an effect on the health of the progeny. Then, after *putreshti yaaga*, the act of copulation is suggested on even days for *pumgarbha* and odd days for *streegarbha*¹¹.

b) Aharakrama

During the *garbhadana charya*, the couple must maintain a particular *aharakrama*. For the first three days of *ritukaala*, *ritumati* is given *alpahara*, including *ksheerasiddha* and *yavanna*¹². Both food items

are recommended for *koshtashodhana* and *karshana*. This is done as a *vaatanulomaka* prior to *garbhada-na*. *Koshta*, as per Arunadatta is the *madhyapradesha* where *garbha* is taking its *adhishtana*¹³. Thus, *ahara* with *shodhana karma-guna* is given to stop any possible complications. After the *putreshti yaga*, on the same day in the afternoon, *purusha* should eat *ghruta* and *payas* (both *ghrita* & *ksheera* are *shukrala*), whereas *stree* is prescribed with *taila* and *masha* (both are *vaatanulomaka*). That is, as explained, “*shukram saumyam*¹⁴”, the male partner should eat *saumya-gunayukta padaartha* made with a predominance of *ghruta* and *ksheera*. While *taila* and *masha* are *agneya pradhana dravyas* and *aartava* is *agneya* in *guna*¹⁴, the food should be processed with *taila* and *masha* to enhance this *guna*. *Masha* and *taila* are *ushna veeryapradhana*. Due to its *ushnaveerya*, these act as *kaphapittakara*. This will improve the *veerya* for *aartava* as well.

V. PUMSAVANA

VI. Once the *garbha* attains *vyaktabhava*, the next *charya* of *pumsavana* is performed. *Pumsavana* is defined as “*pumstvakaarakam karma*¹⁵”. It is explained in several steps by Acharyas:-

Charaka ¹⁵	Sushruta ¹⁶	Vagbhata ¹⁷
<i>Dadhi</i> added with either <i>goshta jaata vatashunga</i> , <i>dhanya masha</i> or <i>gaura sarshapa</i> - to be consumed on <i>pushya nakshatra</i>	<i>Nasyakarma</i> to be done by <i>garbhini</i> herself to her <i>dakshina nasaputa</i> with <i>kalka</i> of either <i>lakshmana</i> , <i>vatashunga</i> , <i>sahadeva</i> , or <i>vishwadeva</i> mixed in <i>ksheera</i> . 3-4 drops are prescribed as ideal, and this shouldn't be spitted out	<i>Shweta bhratimoola kalka</i> mixed in <i>ksheera</i> should be instilled to right nostril for <i>putra</i> and to left nostril for <i>putri</i> .

<i>Ksheera</i> processed with <i>kalka</i> of <i>jivaka</i> , <i>rshabhaka</i> , <i>apamarga</i> and <i>sahachara</i>		Drugs like <i>gauradanda</i> , <i>apamarga</i> , <i>jivaka</i> , <i>rshabhaka</i> and <i>saireyaka</i> altogether or in 2-3-4- groups should be made into <i>kalka</i> and mixed with <i>jala</i> is made to drink on <i>pushya nakshatra</i> .
One <i>Anjali</i> of <i>jala</i> added with <i>kudya-kidaka</i> or <i>matsyaka</i>		One <i>Anjali</i> of <i>jala</i> added with <i>kudya-kidaka</i> or <i>matsyaka</i>
An idol made up of either <i>swarna</i> , <i>rajata</i> or <i>ayasa</i> is dipped in <i>dadhi</i> , <i>payas</i> or <i>udaka</i> in <i>Anjali pramana</i> is advised as a drink		An idol made up of either <i>swarna</i> , <i>rajata</i> or <i>ayasa</i> is dipped in <i>dadhi</i> , <i>payas</i> or <i>udaka</i> in <i>Anjali pramana</i> is advised as a drink
Inhale the steam of <i>shaalipishtha</i> seated on a <i>dehali</i> (outset) and drop the liquid portion of the same to her right nostril herself.		One <i>anjali</i> of <i>jala</i> added with <i>kudya-kidaka</i> or <i>matsyaka</i>

If we analyse the drugs which are recommended for *pumsavana karma*, many are found to be *balya*, *jeevaniya* and *rasayana* with specific actions like *shukrala*.

***Ksheera*¹⁸**

Charaka opined, “*Ksheeram jeevaneeyanam shreshta*”. It is one among *nitya sevaniya dravya* and *achara rasayana*. Due to its *rasayana* action, it certainly does *pushti* to *rasadi dhatu*. *Shukra*, being the purest *dhatu* capable of generating another life, is nourished and well-formed due to *ksheera sevana*. *Aartava* is explained as the *upadhatu* of *rakta*, thus *rakta dhatu pushti* will in turn enhance *aartava*.

***Masha*¹⁹**

Masha is *guru* and *madhura* in *paka* and *rasa*. It has properties like *bruhmana* and *shukrala*, as seen in the scriptures. Along with these actions, *vata (anilaapaha)* is also balanced.

***Sarshapa*²⁰**

Gaura sarshapa, which is *shreshta* among the types of *sarshapa*, is indicated for *pumsavana karma*. Compared to the properties of the former drug *masha*, *Sarshapa* is *katu paka* and *teekshna-ushna gunayukta*. As it is *agneya pradhana*, it enhances *aartava guna* as well. Thus, the balancing of *tridoshas* and *dhatu* is achieved by the opposite action of the two drugs.

Balancing *tridosha*, mainly uninterrupted *apaana vata karma*, is the priority during *garbha kala*. This can be seen in the actions performed by the drugs mentioned in *pumsavana*.

PERIOD OF PUMSAVANA:

Charaka Samhita - As per Charaka, *pumsavana* is advised in *aapanna garbha*, where *garbha* is in *pragvyakta bhava*. *Pragvyakta bhava* is when the sex, as well as organogenesis, are indistinct. At this stage, if *pumsavana karma* is performed, it will be capable of changing the sex of the child to the desirable one¹⁵.

Sushruta Samhita—Dalhana elaborates *pumsavana karma* in three different phases of *garbhakala*. It is to be observed during planning for the viability of the begot child and for seeking a child of the desired sex.

- a. *Garbhagrahanartham* – *nasyadana* followed by *gramyadharm sevana*
- b. *Garbhasthapanartham* – *nasyadana*
- c. *Putraapatya janartham* – repeating the *nasyadana* within three months of conception¹⁶.

Ashtanga Hridaya – Arunadatta, commenting on *Vagbhata*, specifies that *pumsavana karma* should be performed before *vyaktavastha*. That is before the sex of the child is not determined. During the first week, *garbha* is *kalala sadrusha*, and *streepurusha utpatti lakshana* is *avyakta*. Thus, within the first month of *garbhakala*, it is considered ideal. This is just after *sadyogriheeta garbha lakshana* is observed

by *garbhini*. Therefore, it ensures *garbhasthapana* also¹⁷.

IMPORTANCE OF PUSHYA NAKSHATRA

Pushya is the 8th *nakshatra* among *nakshatra* *vyuhas*. Across the treatises of Ayurveda, *pushya nakshatra* is mentioned as the ideal time for any *Mangala karma* or *achara* for its auspiciousness. *Pumsavana* is also recommended on *pushya nakshatra* because of its benefits, as it resembles a cow's udder, bringing prosperity, fertility and abundance.

It is also said that if the drugs are collected on the day of *pushya*, the drugs will possess maximum medicinal qualities rich in *guna-karma-prabhava*. *Pushya* also influences balancing the *tridosha*, has *rakshoghna karma* and thus enhances the efficacy of the *karma* when performed on the day wholly²¹.

VII. MASANUMASIKA GARBHINI CHARYA

Garbhini is advised to follow a specific Diet Regimen, predominant in *madhura rasa* and *snigdha guna*. This will help in *vaataanulomana* and uninhibited growth of the *garbha* in a balanced manner.

Maasa	Charaka ²²	Sushruta ²³	Vagbhata ²⁴	Haarita ²⁵
Prathama	Anupaskruta ksheera	Madhura sheeta dra- vaahara	Anupasamskruta ksheera	Yashtimadhu, madhuka- pushpa with butter, honey and milk
Dwitiya	Madhuraushadha siddha ksheera	Madhura sheeta drava ahara	Madhuraushadha sid- dha ksheera	Kakoli, sarkara and dug- dha
Tritiya	Ksheera with madhu-sarpi	Madhura sheeta dra- vaahara Shashtikodana with ksheera	Madhuraushadha sid- dha ksheera along with sarpi and madhu	Krishara
Chathur- tha	Ksheera navaneeta in akshamatra	Hridyaanna processed with paya and navaneeta along with jangalamamsa Shashtikodana with dadhi	Madhuraushadha sid- dha ksheera with navaneeta in akshamatra	Samskruta odana
Panchama	Ksheerasarpi	Ksheerasarpi Shashtikaudana with payas	Ksheerasarpi	Paayasam
Shashta	Madhuraushadha siddha ksheerasarpi	Yavagu mixed with shwadamshttra siddha ghrita Shashtikaudana with sarpi	Madhuraushadha sid- dha ksheerasarpi	Madhurarasa yukta dadhi
Saptama	Madhuraushadha siddha ksheerasarpi Kikkisa chikitsa	Prithakparnyadi sid- dha sarpi	Madhuraushadha sid- dha ksheerasarpi	Ghrita khanda
Ashtama	Ksheera yavagu with ghrita	Asthapanabasti with badaradi siddha kashaya followed by anuvasanabasti	Ghritamishra ksheer- ayavagu Asthapanabasti with badaradi siddha kashaya	Ghritapuraka
Navama	Tailanuvasana with madhuraushadha siddha taila.	Snigdhayavagu and jangala rasa	Anuvasanabasti Yoni pichu	Vividhaanna

Yoni pichu with the same taila

DISCUSSION

A reference to parent-child relations comes from *Srimad Bhagavatam*²⁶, where the father hymns to his child that:-

“You have taken birth from my four limbs and arisen from my heart. You are myself in the form of my son. May you live through a hundred autumns.”

***Angad angad sambhavasi hridayad abhijayase /
Aatma vai putra naamasi twam jeevasharadah shatam //***

This beautiful explanation almost sums up the role of parents in the inception and development of a new life. Features of the parents, both physical and mental, are equally responsible for being an “ideal child”. To have such a child, Acharya Sushruta explains a wonderful formula:

***dhravam chaturnam sannidhyat garbhah syad
vidhipurvakam/
rtukshetraambu beejanaam samagryad ankuro
yatha //***

This verse gives all the prerequisites to have proper *garbha* : normal periodic reproductive cycles, a healthy reproductive organ, complete nutritive support and balanced amount of *beeja*. A child born in such a way would be *roopavan* (handsome), *satwavan* (virtuous), *chirayusha* (bestowed with long life) and *rnasyamoktara* (redeems the parents from their debt) and hence called as *Suputra*. But anything amongst these factors if deficient or gone wrong will create adverse results in *garbha*. Correspondingly, when the couple does not follow *garbhadana charya* and plans for a conception, land in adverse outcomes such as either *vighata* or *vikruti*.

Hereon, each of the points shall be critically analysed:-

Tulyagotra and Garbhavikruti

Partners of *tulyagotra* are considered as *adharmā*, *dharma shaastreshu nishiddhatwaat*, a sin without solution. This is because if the couple are from the same clan, it could lead to disorders which run in the family. Ashtanga Sangraha-kara quotes this as *kula*

sanchaari roga with examples like *kushta* and *paingalya*. A child born otherwise is *roopa-sheela-lakshana-sampanna*²⁷.

The effect of consanguinity in generating genetic disease has been well known for years. Consanguineous marriage between first cousins, the chance of the child inheriting a recessive gene from both parents originated from the common grandparents is 1 in 64. The chances of receiving a recessive gene from the other common grandparents also are accounted thus increasing the risk of homozygosity of a disease making it 1 in 32. If everyone carries the recessive genes, the chance is elevated to 1 in 16²⁸. In light of these facts, it is observed that:-

- ❖ First degree consanguinity and chance of disorder- 5% of the general population
- ❖ Second degree consanguinity and chance of disorder - 1% of general population
- ❖ Early studies in India regarding consanguineous marriage revealed that most of these close kin union were between first cousins. The frequency of consanguinity was linked with many conditions like
 - a. Autosomal recessive disorders – Cystic fibrosis, hemochromatosis
 - b. Congenital heart disease – Ventricular septal defect
 - c. Neurological malformations – Kennedy syndrome, Huntington’s Disease
 - d. Consanguinity associated adult-onset diseases – Familial Alzheimer’s disease

Thus, consanguinity can be a primary reason for genetic as well as hereditary manifestations all over the world. Unfortunately, in India, the practice of consanguinity is widely seen especially in South Indian states of Andhra Pradesh, Karnataka and Tamil Nadu²⁹.

Beeja-bejabhaga-bejabhaga avayava dushti leading to garbhavikruti

Beeja, the *karana*, *nimitta*, or *hetu* for any sprout is considered as *shukra* and *shonita*³⁰ as per our *acharyas* in the context of *garbha*. If the mother doesn’t practice the *charyas* for *garbhadana*, the possibility

of *dushti* in the *beeja*, *beejabhaga* and *beejabhagasya-avayava* is high. As per Charaka, when the *beeja* is *dushta* as a whole, *garbha* is *asambhavya* i.e failed

<u>Stree beeja</u>	<u>Vikruti</u>	<u>Purusha beeja</u>	<u>Vikruti</u>
<i>Shonita beejabhaga dushti</i>	<i>Vandhyaa</i>	<i>Shukra beejabhaga dushti</i>	<i>Vandhyam</i>
<i>Shonita beejabhaga avaya-vadushti</i>	<i>Putiprajaa</i>	<i>Shukra beejabhaga avaya-vadushti</i>	<i>Putiprajaa</i>
<i>Shonita beejabhaga avayavasya streekara bhava</i>	<i>Stree aakruti bhuyishta astreeya Vaarta</i>	<i>Shukra beejabhaga avayavasya purushakara bhava</i>	<i>Purushakruti apurusha Truna putrika</i>

Here with *beeja*, we shall consider the *shukra* and *shonita* as a whole, whereas *beejabhaga* to be the chromosome present in a cell of it and *beejabhaga avayava* to the genetic material inside it. This example is the sole evidence of genetics and its related diseases in Ayurveda. Through this we can comprehend the importance of pre-conceptual care and practice in couples.

Acharya Charaka elaborates this concept with example of *garbhashaya* in females. *Vandhya*, the condition where the *garbhashaya beejabhaga* is *dushta*, the factor which is needed for the *ashaya* to be developed is absent or hampered. Similarly, it is for the *shukrashaya* also. When the *dushti* is in *beejabhaga avayava*, the condition is understood that a part of the *ashaya* is curbed. Thus, the functional purpose of that structure is suppressed.

Finally, during the explanation of *vaartha* or *trunaputrika*, the *aakruti* of the child would be female or male but he or she would behave and act oppositely. In our developing society, sexual identity and sexual orientation have had a massive change from its primitive ideologies. Other than male or female genders, transgenders are also accepted not only biologically but socially. The American Psychological Association defines transgenders as ‘an umbrella term encompassing those whose gender identities or gender roles differ from those typically associated with the sex they were assigned at birth’. These conditions mentioned by Charaka could be correlated with transgender concepts.

Maatruja and pitruja bhavas

conception.

But in the case of *dushti* in parts of *beeja*, different conditions are explained specifically to the gender of the parent³¹:-

As seen above, *Matrujabhava* and *pitruja bhava* immensely contribute to the systemic development of the child since conception. These factors either directly or indirectly aid in the child's growth. Thus, any hindrance to these factors might result in the child having an underdeveloped or improperly developed organ.

◆ **Maatruja bhava**

Contemporarily, maternal factors are thoroughly studied for prevention and early diagnosis of the child's congenital and genetic abnormalities. **Barker's Hypothesis** states that the in-utero environment of the fetus programs it in health and longevity both positively and negatively. We shall see this with some examples:

- Studies are undertaken to explore Maternal effect Genes (MEGs) and their role in embryonic development. MEGs are the genes encoded in the oocyte that control embryonic development prior to the activation of the embryonic genome³².
- When these encodings come up with variations (mutations/damaging), various adverse outcomes will occur. In human beings, this results in malformations like hydatidiform moles, zygotic cleavage failure, structural birth defects, congenital heart diseases in particular, etc.
- Maternal obesity and overweight are other prevailing reasons for heart defects like tetralogy of Fallot, D-transposition of great arteries, truncus arteriosus, etc, in their offspring³³.
- Maternal obesity is a main concern in fetal muscle generation. It alters mesenchymal stem cells, down-regulates myogenesis, and enhances adipogenesis³³.

- Other than familial history and consanguinity, chronic hypertension and diabetes are found to be reasons for congenital kidney diseases like infantile polycystic kidney disease, Lowe syndrome, etc.

◆ **Pitruja bhava**

The hard and firm structures like *kesha*, *danta*, *asthi*, etc, are the *pitruja bhavas* in *garbha vikaasa*. The role of paternal factors in genetic and hereditary diseases is also thus a concern in the current scenario.

Achondroplasia, an autosomal dominant disorder with a mutation in the fibroblast growth factor, is a rare, non-lethal disease inherited from the father. Cartilages are formed from chondrocytes and the precursor cells of chondrocytes come from bone marrow specific mesenchymal stem cells. Research shows that stem cells are produced by maternal and fetal blood. Inherited conditions like male pattern baldness are found to be polygenetic and baldness strongly associates to the X chromosome (AR gene). These examples imply the need and scope of research in the field of both normal and abnormal growth of paternal contributions in *garbha vikaasa*. Going through the unexplored parts would be the best solution to correlate and understand acharyokta *bhavas* and the rationale behind it.

Genetic inheritance exclusively from the father includes the y chromosome which includes the male reproductive structures and hormones. Apart from that, the paternal factor has significant influence over the texture of the hair, colour of the eyes, teeth, and height of the individual.

Rasajabhava

Rasajabhava, contextually the *ahara rasa* is essential for the mother to survive let alone the “*garbhajanma*”. The *ahara rasa*, which is the *poshyabhaga* helping the *garbha* grow reaches it through *nabhinadi*. The *nabhinadi*, contemporarily understood as umbilical cord if defective (like in cord cysts or single umbilical artery) the *garbha* will be unable to grow as it is solely depending on its mother for nutrition. Numerous studies have been found regarding placental as well as cord defects resulting in intra

uterine growth retardation and still birth. Several articles show the relation of single umbilical artery and its association to congenital heart diseases with major cardiac defects like PDA, Valvular pulmonary stenosis and extra cardiac presentations (renal/other genetic)³⁴.

Role of dauhruda avamaanana in garbhavikruti

Dauhruda composed of 2 words *dau* and *hrida* denotes 2 *hridaya*. This concept explained by Sushruta in 4th month of *garbha vikaasa* and in 3rd month by other *acharyas* expound that *garbhasya hridaya* starts to become evident by this month. As all the organs are formed concomitantly, *hridaya* also buds along with it. But when it becomes apparent, *chetana dhatu* shows its *vyakta bhava* through signs like a functional *hridaya*. During this stage, *garbhini* desires certain things which is said to be the offspring’s desire. Any neglect towards these desires results in *garbhasya vinasha* or *vikruti*. Acharya Chakrapani interprets this as: - if the desire ignored is the fetus’ desire, then *garbhavinasha* occurs and if the desire is mother’s, it will generate *garbhavikruti*. To elaborate, *dauhruda vighata* of *garbha* results in *vataprakopa* and affects the *garbha* which is *sukumaratara* in nature and total destruction is the consequence, whereas when motherly desires are impeded, it creates *vata kshobha* in the pregnant lady. This *vikrutavata* makes *kubja*, *kuni*, *panguaadi*... *garbhavikruti*.

Acharya Sushruta explains *dauhruda avastha* during the 4th month of pregnancy, the time when *chetana dhatu* is *abhivyakta*. Simultaneously, all the *indriya* also becomes clear in functioning. At this time, pregnant ladies go through various physical as well as psychological challenges. Lady yearns for unusual comforts which may be related to sight, taste or smell etc. These conditions are said to be satisfied through all the *indriyarthas* like *shrotradi* etc.

It is very common to see pregnancy cravings in a lady where she wishes to eat a specific food item, desires to watch a specific view, travel somewhere or showing aversion towards a food item, a smell or hatred towards a sight.

An altered olfactory sensation is also one of the changes during pregnancy period. The pregnant lady can have hyperosmia, hyposmia, parosmia or odour hedonics. Altered sensations are found to have a protective action on the offspring by avoiding intake of whatever could probably damage the development of the fetus whereas odour hedonics or pleasantness of odour can positively affect the growing fetus³⁵.

Studies regarding the infants born to mothers who were exposed to music/ music therapy during antenatal period shows commendable impact on the developmental milestones of them. The children showed better motor performance, orientation, habituation and reflexes³⁶. On the other hand, babies of women who consistently were exposed to sounds above the limit of 85 decibels during pregnancy can have a risk of being born with low birth weight and having hearing dysfunction. This might be due to the stress developed in the mother during the loud exposure resulting in altered neurological development.

Food cravings of gravida are directly linked to dopaminergic mesolimbic circuitry and nucleus accumbens. Dopamine is known as a regulator of reward system³⁷. Persistent cravings of the lady can have negative impacts on the fetus. This persistence can be linked with the dissatisfaction of the lady for her cravings. If she is not satisfied with the (results), she craves more and the intake of any of these cravings be it gustatory or olfactory etc. can negatively affect the growing fetus too. Here we can clearly connect *avamaanana* to persistent feelings. *Avamaanana* means *amaryada* or *apamana* which can be meant as either ignoring or over exposure.

In *vatakalakaleeya adhyaya* while explaining about the karma of *shareerastha prakruta vata*, Charaka says *vata* is “*indriyanam udyojaka*” and “*indriyarthanam abhivoda*”³⁸. In the *garbha* also, *vata* is accountable in the development of the sense organs and its functional aspects. This *vata* itself generates the cravings or feelings in the *garbha* which is shown up through the mother. Thus, if *prakruta vata* is not taken care of, *prakruti* turns into *vikrutavastha* ending up with *vatajanya rogas* like *kubja*, *kuni*, *minmina* etc

Sushruta also explains similarly stating that *dauhruda avamanana* to each *indriya* and *indriyarth* brings about *dushti* in respected *indriya* and *indriyarth*. This is because if such desires aren't fulfilled or satisfied it builds a *bhaya* (in turn creates a feeling of neglect or insecurity) in *garbhini*. *Bhaya* eventually is *vata prakopaka*.

Matapitrornastikya in garbhavikruti

Nastikata is *nastikasya bhava*. One's disbelief over anything, for example, non-existence of *paraloka* or *sukruta* is *nastikata* (Bhaarata). Acharya Sushruta says parents' *nastikya bhava* results in *garbhavikruti* due to *vatadi dosha kopa*. Commenting on the *shloka*, Dalhana says *naastikya* is not having belief in *paralokam* (*na asti paraloka*) or *dattam* (*na asti dattam*)³⁹. *Dattam*, described as 7 types in Narada Samhita contains *panyamoolyam* (*panitavyam vikreya dravyam*: donation in cash/kind), *bhruti* (*kru-ta karmani dattam vetanam*: remuneration), *tushti* (to compliment), *snehat* (*snehasoochana*: testimonial), *pratyupakara* (reciprocating a gesture), *stree* (wedding bestowal), and *anugrahartham* (charity)⁴⁰. That is, when a mother or both parents do not have belief about either *paraloka* or *daana*, or any of the rituals to be practiced before *garbhadana*, the very principle of *garbha avatarana* gets offended, wherein the *aatvaahika purusha* is explained draping itself as a *garbha*. Parental cynicism prompts them to ignore *aahara-viharakarma* which terminates in *vatadi doshaprakopa*. This imbalance could make *vikruta-garbha*. “*Vaidyasya nastikata*” can also be taken to account here. When the *vaidya* is ignorant about *charya* and doesn't guide a couple well, *duswaasthya prapti* can be the result. In this context, we can remember Charaka's reference, “*nastiko varjyaanam*”.

CONCLUSION

Shareera Sthana of every Ayurveda Samhita immensely contribute to make a healthy lineage or descent rather than limiting to a childbirth. This is evident in all the chapters of the *sthana* beginning with *srishti utpatti*. Thereon, *acharyas* elaborate the process of *garbha* formation including *avakramana*,

garbhasya vyakarana, garbhasya vikasa and vikara. This meticulous detailing thus makes *swasthya rakshana* the extreme aim of Ayurveda. Conclusive planning towards *garbhadana* is essential in today's scenario also, so as to have preventive measures in congenital and genetic diseases. Genetic diseases duly caused by the genetic redesigning of parents are fatal and untreatable even in our technologically advanced society. *Beeja*, taking different meanings at different contexts like *nimitta, karana and hetu* of a *karya*, in our context of *garbha* is *shukra aartava*. The *beeja, beejabhaga* and *beejabhaga avayava* are ultimately formed by *pancha mahabhoota*. Any *dushti* or *dosha* in *beeja* results in a *dushta* or *vikruta garbha*. This *vikruti*, if we analyse can be found in the most basic structural composition of *pancha mahabhoota*. Thus, maintaining the balance of *mahabhoota* is the quintessential part of preventing any kind of *garbhavikruti*. When we analyse each of the points discussed in detail above, we can reach to a conclusion that, like every other animal in the universe, humans are also thriving to "sustain" life for themselves and for their future. For that, an immense amount of planning has been in practice for ages. We aspire to have a child; not just a healthy one but also with longevity and virtuousness beyond just the continuation of lineage but also a worthy individual of the society. By this eventually we would be able to build a *rashtra* rich in values, resources and wisdom. Commitment to aforesaid *charyas* like *atulya-gotreeya, ritumaticharya, putreshti, pumsavana and garbhincharya* could take us towards this along with help of *vajeekarana chikitsa and sadvrutta. Ritumati charya, pumsavana and masanumasika garbhini* paricharya emphasizes the importance of strict and meticulous diet and regimen which are mostly having the *karma* like *jeevaniya, balya, rasayana and vajeekarana*. This enhances the property of *beeja* in all aspects by keeping a balance in *mahabhuta, dosha* and *dhatu*. Satisfying a pregnant lady's needs itself creates a happy and contented environment for the child to grow in the *garbhashaya* by reducing the stress factors of the mother. By practicing these, even the deadliest genetic disorders which are itself a

rocket science now can be laid aside. Our science, proudly inscribing these winning formulae ages back could be used in all its possible ways to overcome the genetic and hereditary dilemma.

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