AYUSHDHARA
ISSN: 2393-9583 (P)/ 2393-9591 (O)
An International Journal of Research in AYUSH and Allied Systems

Review Article

CONCEPT OF *AAHARA* AS A CAUSATIVE FACTOR IN *GARBHA VIKRITI*

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Article info
Article History:
Received: 02-01-2022
Revised: 28-01-2022
Accepted: 06-02-2022
KEYWORDS:
Ahara, Garbhang Vikriti, Tridosha, congenital defects.

ABSTRACT

A healthy live baby is achievement in today scenario. The graph of congenital abnormality and mortality is raised day by day. Many times we avoid importance of food in *Garbha* and not consider it as a cause of congenital defects. Nutrition can contribute directly or indirectly in a disease pathogenesis and its appearance. Food is the base of life and *Sharira.* Acharyas has mentioned *Ahar*a is responsible for *Deha* as well *Vyadhi* and it also leads to balance of *Tridosha*. Fetus depends for nutrition on mother and its development totally depends *Matrija Ras Dhatu.* Thus, here food plays a role in balancing of *Tridosha* indirectly. In Ayurveda *Matrija Ahara* also consider as an important cause of *Garbhang vikrti*. Thus, balanced *Aahara* by mother leads to balanced *Dosha* and a good normal healthy baby. *Vishmaavstha* of *Dosha* leads to abnormality i.e., *Vikriti*. Diet during pregnancy decides the health of baby as well as health of mother. *Ahara* after digestion not only responsible for fetal growth but also for normal organogenesis. This article explains importance of *Matrija Ahara* in normal baby and also effect of *Dosha Vridhikara Aahara* on foetus in congenital deformities. The aim of this article is to evaluate the role of *Matrija Aahara* in *Grbhang Vikriti* and open up scope of more study of effects of food in genotype and phenotype.

INTRODUCTION

Human is best creation of God and proper shape; size and weight of human body is also a wonder of nature. The worst aspects of pregnancy are a malformed alive fetus. Ayurveda scholars felt the importance of six procreative factors *Shadgarbhakarabhavas)* [1] such as:

1. ***Matrija*:** Maternal factors (similar to organs from ectoderm organs)
2. ***Pitrija:*** Paternal factors (similar to organs from mesoderm and endoderm)
3. ***Atmaja*:** *Atma* (Soul factor)
4. ***Satmyaja*:** (Include Wholesomeness)
5. ***Rasaja:*** (Nutrition)
6. ***Sattvaja:*** (Mental status)

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Quick Response Code	
	https://doi.org/10.47070/ayushdhara.v9i1.903

In gestational life organogenesis/functional/ psychological phenomenon is assigned with certain procreative factor mentioned above. In Ayurveda *Garbhavikriti* is described as any structural and functional abnormalities of the fetus which either may internal organs or external deformity. Thus; any abnormality or variation from the normal is *Garbhavikriti*.

MATERIALS AND METHODS

References from the literature collected from Ayurveda classics texts, commentaries, modern literatures, research journals available in institute library, online portals like PubMed Central, AYUSH Research Portal, Google Scholar etc., and analyzed to frame conceptual work.

DISCUSSION

Predisposition to a disease as well as selection of a preventive and curative regime is primarily based on phenotype (*Prakriti*)[1] which is a consequence of the relative proportion of three entities (*Tri Dosha), Vata, Pitta,* and *Kapha* which are not only genetically determined by *Shukra* [sperm] & *Shonita* [ovum], but also influenced by the factors like geoclimatic, *Panchamahabhoota (Mahabhuta Vikara)*, maternal diet

and lifestyle *(Matraja Ahara Vihara*). Thus, one's *Prakriti* is based on the state and nature of *Dosha* at the time of fertilization.[2] If it is vitiated at the time of fertilization then it results in congenital anomalies.[3] Thus, the *Prakriti* by means of its concerned *Dosha*, determines inter individual variability in response to diet, disease and medicine. In recent studies, evidence has to be explored to connect these concepts of *Tridosha* and *Prakriti* with metabolic disorder, chronic diseases and different genotypes also.[4] *Samyavstha* of *Dosha* is normal and leads to *Prakriti* and any deviation from *Prakriti* is *Vikriti*. Congenital anomalies defined as structural or functional anomalies that occur during intrauterine life and can be identified prenatally, at birth or later in life.

The Ayurvedic perspective of congenital anomalies divided in *Adibala pravritha* (due to defect in germ cells) and *Janmabala pravritha vyadhi* (due to defect in somatic cells in the intra-uterine environment).[5] *Adibala pravritha vyadhi* are because of defective sperm *(Shukra*) and ovum (*Shonita*) and are determined right at the time of fertilization and *Janmabala pravritha vyadhi* are because of *Maturapacharaja* i.e., improper maternal diet & regimen and its impact throughout the intrauterine period.[5]

Garbhanga Vikrti Nidana

The reason behind congenital disorder in classic texts may be due to previous habitats (*Papkarma* or *Porvakarma*), and may be hereditary (*Bijadosha*) and may be due to *Vikrit Matrij Aahar* and *Vihar* as described in table.

***Charak Samhita*[6]**	***Sushrut* Samhita [7]**
Beejadosha	*Mata-pita ka Nastikya*
Atmakarmadosha	*Papkarma*
Ashayadosha	*Dauhridini ki avmanana*
Kaala Dosha	*Purvakarma*
Mata ka Aahar- Vihar	

As mentioned above all Acharyas give equal importance to maternal diet and lifestyle in creating anomalies. Thus, *Matrija Aahara* and *Vihara* play an important role to give a healthy progeny.

***Aahara* in Ayurveda**

In Ayurveda, *Aahara* consider as *Brahma* (mythologically, the creator of universe) because every animate object is dependent on energy for survival and food is source of energy.[8] Food interferes with the molecular mechanisms of an organism's "phenotype". *Bhagwad Geeta* also acknowledged diet as a source for the creation of life. *Ahara* act as a causative factor, in the context of the origin of *Purusha* (man) and his diseases, according to *Charaka Samhita*.[9] Also Susruta Samhita comprehensively narrated dietetics concerning the applicability and significance of diet in human life and establishing the historical importance of diet. Charaka proclaims that *Ahara* is responsible for maintaining the balance of *Doshas* (biological humors) and *Dhatus* (body components) by promoting healthiness and disease avoidance.[10] *Ahara* restores vigour, provides strength, sustains the body, and increases lifetime, bliss, memory, *Ojas* (immunome), and digestive capability.[11] According to Ayurveda, '*Dosha, Dhatu* and *Mala'* collectively form the human body.[12] '*Dosha'* have a premier role among them because they control and maintain the bodily functions. The concept of *Tridosha* involving *Vata*, *Pitta*, and *Kapha* is the central doctrine of Ayurveda. In definition of healthy there is a state of *Samagni Samdosha*, *Samdhatumala Kriya*. Vitiated *Dosha* leads to pathology and create disease condition.

***Aahara* and congenital defects**

As *Aahar* reason of *Dosha* balance as well as improper diet leads to vitiation of respective *Dosha* by theory of Ayurveda. *Matrij ahara* also an imp factor which may leads to vitiation of *Doshas* in maternal body and also leads to congenital fetal anomalies. Each *Dosha* have been ascribed to distinct properties and functions such as *Vata* is responsible for manifestation of shape, cell division, signaling, movement, excretion of wastes, cognition and also regulates the activities of *Kapha* and *Pitta*. *Kapha* contributes to anabolism, growth and maintenance of structure, storage and stability. *Pitta* is mainly responsible for metabolism, thermoregulation, energy homeostasis, pigmentation, vision, and host surveillance. Thus, vitiated *Dosha* can cause deformity relating to their function. According to *Vaghbatt* when a pregnant woman consumes continuously the diet capable of aggravating *Doshas,* then vitiated *Dosha* moving through whole body reaches uterus, settles there and makes the fetus (child). [13]

Vata	***Pitta***	***Kapha***
Jada (idiot)	Baldness	*Kustha* (leprosy)
Deaf	Premature hair graying	*Kilasa* (skin disorder)
Dumb (*Mooka)*	*Pingal Nakha, Twaka*	*Sadanta* (congenital presence of teeth)
Hoarse or nasal voice	Other *Roga* of *Pitta*	
Lame, humpbacked, dwarf,		
Less or greater number of body parts		

Bhela says vitiating *Vata* other than above deformities also produce deafness.

Here vitiated *Dosha* also leads to epigenetic changes. In modern days epigenetics is the branch which refers to the external modification of DNA that turns genes on and off, affecting gene expression. This occurs without changes in the basic structure of the DNA. This gene expression can have transgenerational effects. The major factors that cause epigenetic changes are lifestyle and behavior, diet and digestion, stress, and environmental factor.

Vataja aahara

Here *Vata* is made up of Air and Space and responsible for movement and creativity. *Vata* is also responsible for circulate the blood, move nutrients within the body, move the waste out of the body, and control respiration. The *Gunas* (qualities), of *Vata* are dry *(Ruksha)*, light (*Laghu*), cold (*Shita*), rough (*Khara*), subtle (*Sukshma*), mobile (*Chala*), and clear (*Vishada*). [14] Elevated *Vata* at any point, would lead to the increase in one or more of those characteristic *Gunas*. *Acharya Charak* also mentioned that normal *Vata* has function of *Sanyog* and *Vibhaga*. [15] Here, *Sanyoga* indicates the attachment or binding of cells to form tissues and *Vibhaga* for the division of cells and are easily observed in *Garbha.* In classic text It is properly stated that '*Garbhakruti Nirman*' is function of *Vata Dosha.* [16] For example, aggravated *Vata* could leads to structural deformities of the body which can be congenital or acquired after birth. Cleft lip, cleft palate, polydactyly i.e., extra fingers or toes, clubfoot, congenital heart defects like atrial or ventricular septal defects, transposition of great arteries, pulmonary atresia, tetralogy of Fallot, patent ductus arteriosus; neural tube defects like spina bifida, anencephaly; Down syndrome having flat head and nose, deviation of first toes, stunted growth, proportionately large tongue, etc.; these are the examples of congenital birth defects.

Also, Formation of *Srotasas* is an essential step required for the development of *Garbha because* Proper nutrition of *Dhatus* occurs after formation of *Srotasas* which leads to development of the human body. *Vata Dosha* with the help of *Pitta Dosha* creates different *Srotasas* in the body. [17]

Malformation of a *Srotas* at the time of development due to vitiation of *Vata Dosha* leads to congenital abnormalities in foetus.

At microscopic as well as macroscopic level it is found that *Vata Dosha* controls the hormonal secretions by stimulating the glands of the body. Excessive stimulation of these glands by *Vata Dosha* leads to hypersecretion of hormones whereas no or less stimulation of the glands leads to their hyposecretion.[18]

Development of zygote occurs through division and differentiation of cells and three primary germinal layers are formed i.e., ectoderm, endoderm and mesoderm[19], which are responsible for specific types of tissues and organs develop. As stated by *Charakacharya*, *paramanu Sanyoga* and *Vibhaga* is function of *Vata Dosha*. The congenital defects due to *Vataj Aahar* mentioned by our *Acharyas* are voice disorder and intellectual disorder like Down syndrome which are mostly due to structural deformity. Mostly voice disorders are due to epigenetic changes during embryonic development and deformity in structure of larynx and vocal cord. If one or both of paralyzed vocal cords, it may be in open or closed position may leads to noisy or difficult breathing, a weak, breathy voice. Spasmodic dysphonia is a nerve problem that can make the voice sound tight, quivery, or jerky, hoarse, or groaning Hormones. Disorders affecting thyroid hormone, female and male hormones, and growth hormones also can cause voice disorders. [20]

Pittaja Aahara

Pitta dosha consist of fire and water and it is responsible for the color of blood and skin, metabolism, digestion, absorption, assimilation and *Gunas* of *Pitt*a mentioned by our Acharyas are hot (*Ushna*), sharp (*Tikshna*), light (*Laghu*), liquid (*Drava*), mobile (*Chala*), and oily (*Snigdha*). [21]

Pitta is also responsible for *Srotas* formation. [17] Main characteristics of *Pitta* include digestion, metabolism and energy production. Interestingly, in researches we found PGM1 gene is in the center of many metabolic pathways i.e., glycolysis or gluconeogenesis; pentose phosphate pathway; galactose metabolism; purine metabolism and; starch and sucrose metabolism.[22] In recent studies it is found that PGM1 gene function directly correlates with the role of *Pitta* in metabolism as described in Ayurvedia. Thus, vitiated *Pitta* leads to metabolic disorder and leads to epigenetic changes as well as single nucleotide polymorphism. Vitiated *Pitta* means excessive heat also leads to cell and tissue destruction and leads to congenital abnormalities. There is also increase oxidative stress due to its *Ushna* and *Tikshna Guna* in unbalanced state. It also affects endocrinology due to disturbed gut brain axis. It also acts as teratogens by affecting mediating co enzymes.

Kaphaja Aahara

Consistency of *Kapha* is earth and water and responsible for stability and for holding emotions. The G*unas* of *Kapha* mentioned by *Acharyas* are cold (*Shita*), heavy (G*uru*), slow (*Manda*), oily (*Snigdha)*, liquid (*Drava*), slimy (*Shlakshna*), dense (*Sandra)*, soft

(*Mrudu)*, static (*Sthira*), cloudy (*Avila)*, and gross (*Sthula*)[23] and it is responsible for structure formation. In vitiated form it leads to obesity which leads to disturbed metabolism and improper endocrine glands secretion.

These three *Doshas* also make up the psychophysiological constitution. In DNA expression process, the two strands of DNA separate and the knowledge present in the strand is replicated and comes out as messenger ribonucleic acid (mRNA). The knowledge carried in mRNA is utilized by transfer RNA (Trna), which lines up the designated amino acids to form the specified protein. In research studies it is proposed that mRNA, tRNA, and protein have features and properties that represent *Vata, Pitta* and *Kapha* at the cellular level and messenger RNA corresponds with *Vata* (transmission of information), tRNA corresponds with *Pitta* (transformation), and protein corresponds with *Kapha (*structure). [24]

Also, each *Dosha* should be associated with patterns of functioning of six major areas of the nervous system: The prefrontal cortex, the reticular activating system, the autonomic nervous system, the enteric nervous system, the limbic system, and the hypothalamus and in vitiated form it could leads to improper functioning and ultimately leads to deformity. [25]

Thus, vitiated *Dosha* act as a teratogen and leads to single gene polymorphism. A teratogen crosses the placenta to exert its effect on the developing fetus.

There are six main identified teratogenic mechanisms foliate antagonism, neural crest cell disruption, endocrine disruption, oxidative stress, vascular disruption and specific receptor- or enzyme-mediated teratogenesis. In a study also found that Genes in the immune response pathways were up-regulated in *Pitta* types whereas genes related to cell cycles were up-regulated in *Vata* types, and genes in the immune signalling pathways were up-regulated in *Kapha* types *Prakriti*. [27]

It also proved that inflammatory genes were up-regulated in *Vata* types, whereas up-regulation of oxidative stress pathway genes were observed in *Pitta* and *Kapha* types. [28]

In *Kapha dosha* types it is found that CD25 (activated B cells) and CD56 (natural killer cells) were higher. CYP2C19 genotypes, from family of genes that help in detoxification and metabolism of certain drugs were down-regulated in *Kapha* types and up-regulated in *Pitta* types. [29] It is found in studies each *Dosha* due to upregulation and down regulation of specific genes leads to epigenetic changes.

CONCLUSION

Ayurveda proclaims food is intersecting concepts that are vital for human survival and for therapeutic use also. It interferes with the molecular mechanisms of an organism's "physiome". Hence, research on its interaction and effect with genome is highly relevant toward understanding diseases and their therapies.

Thus, food which vitiates respective *Dosha* also creates disorder and leads to congenital deformity. Ayurveda based on preventive management thus our Acharyas described *Garbhini paricharya* and *Garbhoupghatkara Bhava* to preventive measures for congenital abnormality. There may be more study to find out more genetical changes and its relation with food in organogenesis.

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Cite this article as:
Renu yadav, Seema Shukla. Concept of Aahara as a Causative Factor in Garbha Vikriti. AYUSHDHARA, 2022;9(1):114-118.
https://doi.org/10.47070/ayushdhara.v9i1.903
Source of support: Nil, Conflict of interest: None Declared

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