



## The Effect of Rasaj Bhav (Nutritional Factor) on the Structural Changes in Garbha

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**ABSTRACT:** Ancient *acharya* of *ayurveda* has given great emphasize on intake of *aahara-ras* as best source for nourishment that play prime role in growth and development of embryo/foetus during pregnancy. To achieve a healthy progeny, ayurvedic science have illuminated wholesome regimen, that should be follow by the parents before and after conception. They have also elucidate about six specific procreating factors- *Shad bhav* (*matruja*, *pitruja*, *atmaja*, *rasaja*, *satmyaja* and *satwaja*) which are responsible for the growth of embryo. Among six factors *rasaja bhava* plays an important role in providing nutrition to the foetus. The concept of *Upasneha*, *Upasweda*, *Ambu*, *Apara* and *Nabhinadi* are involved in nourishment of embryo/foetus at different stages of development. Anceint science have drawn attention to certain food habits (*aahar ras vikriti*), to be avoided by the pregnant woman to refrain from abnormalities, deformities in the offspring. The concept of nutrition (*aahar ras-rasaj bhav*) in *garbhini* explained in ancient classics.

**KEYWORD:** Aahar-ras, Shadbhav, Garbhaj-vikriti.

### INTRODUCTION

In *Ayurveda* science *Ahara* is considered under *Trayopasthambha*.<sup>1</sup> Three pillars by which life cannot be maintained. This ancient science of life not only has given priority to *Swasthavritta palana* (daily and seasonal healthy regimen) but also has given attention to antenatal care to produce healthy progeny. These measures should be start before conception by following particular diet and regimen, who aim get benefits and avoid birth defects of the child. *Ayurveda* has elaborate about *garbhini Paricharya* (*uchita aahar ras & vihar paalan*) and specific factors that effect the growth and well-being of progeny. Anceint *Acharya* has told about six *garbhaja bhava* i.e *matrija* (maternal), *pitrija* (paternal), *aatmaja* (Sentient), *rasaja* (nutritional), *saatmayaj*(compatibility) and *sattwaja* (psyche).<sup>2</sup>

*Rasaja bhava* is one among them that is responsible for the nutrition of the embryo/foetus & also for the structure changes that hamper by the poor nutrition intake by the *garbhini*. According to *Acharya Charaka*, *rasaja bhava* does *shareeraabhivridhi* (growth and development), enhances *prana* (life force), instills *trupti* (satisfaction), *pushti* (nutritional) and *utsaha* (enthusiasm) in the fetus.<sup>3</sup> According to *Acharya sushruta*, *rasaja bhava* helps for *shareera upachaya* (anabolic), *bala* (strength), *varna* (complexion) of body and is responsible for existence or destruction of the foetus.<sup>4</sup> *Ayurveda* classics elaborately explain the importance of physical and mental wellbeing of mother, proper nutrition during pregnancy and practice of wholesome regimen which play an important role in achieving healthy progeny. *garbhini* (Pregnant woman), if not

following the *garbhini paricharya* & intake of proper *aahar-ras* may affect by serious illness, deformities & lead to death of child.

## MATERIALS AND METHODS

Literary review and critical analysis of *rasaja bhava* from different samhita of ayurveda, articles, authorized text books and online journals.

### Rasa as Dhatu-

The term *Rasa* is derived from the root 'Ras' meaning movement.<sup>5</sup> *Ras* moves throughout the body as *acharya Dhalhana* said continuity of sound is sideward movement, flame is upward movement, and water is downward movement.<sup>6</sup> *Aahara* composed of *Pancha mahabhoota* component in the form of *Shad rasa-Hridaya*, is its main seat and from there it travels through 24 *Dhamani*, ten of them going upwards, ten going downwards, four going obliquely and dividing into innumerable branches, nourishing the entire body constantly.<sup>7</sup> *Chakrapani*, the commentator of *Charaka Samhita* has mentioned two types of *Rasa* i.e., *Sthayi rasa* and *Poshya rasa*<sup>8</sup> From *Rasa dhatu*, is formed and this formation continues till it becomes *Sukra dhatu* and for all *Dhatu*, nutrition supply is from *Poshaka rasa*. *Poshak ras* play role for the nourishment of fetus in *garbini*.

### Rasa as Ambu-

The term 'Ambu' represents *rasa dhatu* which is formed after complete digestion of *aahara*.<sup>9</sup> The main function of *rasa dhatu* is *preenana* meaning nourishment.<sup>10</sup> In classics, nourishment of foetus is described in two parts. First when the body parts are not perceptible, it gets nourished through the process of *upasneha* and *upasweda*. Second, when the body parts are observable, it receives nutrition through *nabhinadi*.<sup>11</sup> *Nabhi nadi* of *garbha* is attached with *rasa vaha nadi* of mother which carries *veerya* of *ahara rasa* from mother to foetus by *upasneha*.<sup>12</sup> In the first crucial week, womb milk is the embryo's only source of nourishment. Graham Burton of the University of Cambridge and team discovered in 2002 that the glands in endometrial lining nourish the embryo during the first trimester and not the mother's blood and called it uterine milk.<sup>13</sup>

During early pregnancy, the yolk sac is responsible for delivering nutrition to the embryo through a process called vitelline circulation. The yolk sac absorbs nutrients through a complex process and then delivers these nutrients to the developing embryo. This nutrition is essential because the yolk sac is the primary source of nutrition until the placenta takes over at around 10 weeks.

### Rasa as Ahara rasa-

*Khale Kapota Nyaya* (selective uptake), *Kedari Kulya Nyaya* (transportation of nutrients) and *Ek Kala Dhatu Poshana Nyaya* (simultaneous supply of nutrients to whole body). All the theories are relevant and conjointly represent whole process of tissue nourishment at different levels of the metabolism.<sup>14</sup> In prenatal life embryo gets nutrition by *upasneha* (filtration) and *upasweda* (percolation/ secretion) and the foetus by *garbha nabhinadi* (umbilical cord) which is attached with the heart of mother via *rasavahanadi* (blood vessels). Nourishment of body gets established just after the conception, which causes the gradual development of foetus.

The foetus is dependent on mother for its nourishment and is lacking the urge of thirst and hunger. *Aahara rasa* of mother gets divided into three parts- one part nourishes herself, one goes to the production of stanya (breast milk), while one part nourishes the foetus.<sup>15</sup> The vessels (*Dhamani*) of maternal body which carry the nutrients, run laterally and longitudinally in all directions (*Thiryakgata Dhamani*) and through it, tend to foster the foetus with their own *upasneha* (diffusion, selective permeation) all through its perpetuation in the womb. *Rasa* refers to *aahara rasa* due to intake of balanced diet taken by gravid woman. It helps in growth and proper development of foetus.

## VIKRUTA RASA PARINAMA

Deficiency of folic acid leads to deficient methionine production RNA and DNA synthesis. Folic acid is essential for normal mitosis & meiosis. Periconceptional folate deficiency leads to neural tube defects, cleft lips and cleft palate. Tetracycline is a type of antibiotic that can cross the placental membrane and get deposited in the embryo's bones and teeth. Tetracycline exposure can result in yellow staining of the deciduous teeth and diminish growth of the long bones. Anticonvulsant agents eg. phenytoin, produce the foetal hydantoin syndrome consisting of intrauterine growth retardation, microcephaly, mental retardation, distal phalangeal hypoplasia, and specific facial features. Anti-neoplastic or chemotherapeutic agents are teratogenic as these agents inhibit rapidly dividing cells.

Retinoic acid or vitamin A derivatives and oral medications such as isotretinoin are potent teratogens. Craniofacial dysmorphisms, cleft palate, thymic aplasia, and neural tube defects are some of the malformations caused. Nicotine constricts uterine blood vessels and decreases the uterine blood flow further decreasing the supply of oxygen and nutrients to the embryo. This compromises cell growth and cause an adverse effect on mental development. Infants born to alcoholic mothers demonstrate prenatal and postnatal growth deficiency, mental retardation, and other malformations.<sup>16</sup>

Adverse effects on human progeny have been observed in the form of abortion, congenital malformations, low birth weight and increased perinatal loss when the father has been exposed to lead, anaesthetic agents, smoking or caffeine ingestion. These agents alter the morphology of spermatozoa or cause some change in the composition of the semen. The deficiency of glucose, amino acids and oxygen etc. in the mother causes intra uterine growth retardation. Deficiency of iron, folic acid, vitamin B12, protein causes hypoxemia and in turn leads to death. Maternal intake of alcohol, drugs and malnutrition lead to congenital malformation.

## DISCUSSION

The stages of foetal nutrition following fertilization can be classified as-

- Absorption: In the early post fertilization period, nutrition is stored in deutoplasm within cytoplasm and very little nutrition is supplied from tubal and uterine secretion.
- Histotrophic transfer: Following nidation and before establishment of uteroplacental circulation, nutrition is derived from eroded decidua by diffusion and later on from stagnant maternal blood in trophoblastic lacunae.
  - Haematotrophic nutrition: With establishment of foetal circulation, nutrition is obtained by active and passive transfer from third week onwards.
- Trophoblast serves the function as invasion, nutrition and production of hormones for the maintenance of pregnancy.

Local cytokines regulate the invasion of cytotrophoblast in the decidua. Two third of total calcium, three fifth of total protein and four fifth of iron are drained from mother during last three months.<sup>17</sup> Acharya advises liquid food made of milk during first three months of life which indicate the need of calcium and vitamin. Adequate hydration is advised because water constitutes cells, detoxifies the blood, and assists circulation, oxygen and nutrient transportation, increases metabolism. Nutrition, water and associated contaminants affect intrauterine installation of fertilized eggs, particularly sensitive to the levels of natural estrogens.<sup>18</sup> Poor nutrition leads to gestational failures due to the damage of DNA, lipids and protein. Vitamins and minerals control metabolism, gene expression and prevent imbalances between the production and scavenging of radical oxygen species. Increased copper levels relate to polycystic ovary syndrome, androgen excess, oxidative stress and inflammation.<sup>19</sup> New evidence states that uterine glands discharge secretion into intervillous space until eight weeks of pregnancy and these are taken up by syncytiotrophoblast.

Histotrophic nutrition is advantageous to the foetus during first trimester as it provides nutrients, under low oxygen concentration, reducing risk of free radical mediated damage during sensitive period of organogenesis. Haematotrophic nutrition may be considered as *garbha poshana* by *apara* and *nabhinadi*. From 8th week onwards nutrition is taken up by placenta. Placenta is the site of exchange of nutrients and nitrogenous waste between mother and foetus. There will be exchange of oxygen and carbon dioxide across the foetal membrane. The foetus obtains its nutrients, commonly designated as *rasaja bhava*, from maternal blood such as glucose, lipid, amino acid, water and electrolyte.<sup>20</sup> Umbilical cord plays an important role in foetal nourishment by establishing connection between placenta and foetus through which foetal blood flows to and from placenta.<sup>21</sup> Calcium and zinc influence enzymatic function, important for embryo-endometrial interactions. Folate, zinc has antioxidant effects and is important for apoptosis, implantation, placentation, foetal development.<sup>22</sup> Absorption and histotrophic transfer can be compared with the concept of *ambu*, *upasneha* and *upasweda*. Endometrium secretes several steroid dependent proteins, glycoproteins, peptides, cholesterol which are important for growth and implantation. Uterine milk is a nutritive secretion produced by uterine glands during early phases of gestation and nourishes embryo prior to implantation. Following the implantation of blastocyst and establishment of chorioallantoic placenta, there is transition to haematotrophic nutrition with exchange between maternal and foetal circulations.

Ancient *acharya* has told about certain factors that are responsible for the *garbhaj vikriti* (anatomical structural deformities)-

**According to Acharaya Sushrut** – *Ahara* as – dry, food kept overnight, boiled food, wet or moistened food. *Vihara* – night awakening, day sleeping, prolong sitting & abnormal postures, travelling, suppression of natural urges, excessive satiation, excessive emaciation

**According to Acharaya Charaka** -*Ahara* as - tobacco/ smoking, cocaine, alcohol, intake, caffeine (tea, coffee).

*Vihara*- high pitch voice, suppression of natural urges, exercise, coitus, strenuous work, going outside alone to lonely places, visiting cremation places, etc.

- **Nutritional deficiencies-**

(i) **Spina bifida** - A lack of vitamin B9 that is foliate can cause neural tube defects in infants, such as spina bifida and anencephaly which usually begins during the first trimester of pregnancy . In infant with spina bifida, the spinal column does not completely close, resulting in nerve damage and paralysis of leg.

(ii) **Cleft lip & palate** - It is a defect in which the roof of the mouth does not completely close during development. A lack of folic acid, and vitamin A in the mother diet are associated with isolated cleft palate.

(iii) **Congenital heart disease** – A mother how has a diet low in riboflavin and niacin are at risk of having babies with congenital heart disease, especially if they eat diet rich in saturated fats. Congenital diformities found in neonates or foetus can be prevented by following *garbhini paricharya* as per *ayurveda*.

## CONCLUSION

Concept of *upasneha*, *upasweda*, *ambu*, *apara* and *nabhinadi* may be considered under the broad heading of *rasaja bhava* that cause *shareera abhivridi* and *pushti* of embryo/fetus. Improper intake of prenatal nutrition described in ancient science such as absorption, histotrophic transfer and hematotrophic nutrition (*rasaja bhava*) may responsible for the anatomical structural deformities of fetus eg. Spina bifida, Anencephaly, Cleft lip, Cleft palate, Congenital heart disease.

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