



Review Article

THE STUDY OF NUTRITIONAL REQUIREMENTS IN SECOND TRIMESTER W.S.R. *GARBHINI PARICHARYA* ACCORDING TO *SUSHRUTACHARYA*

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ABSTRACT

It is the need of an hour to have healthy pregnancies in Indian population as the normal nutritional requirements in maternal periods of women in India are not getting fulfilled, so as the malnourished and birth defective children are born. Out of three trimesters of pregnancy in second trimester nutrition need are higher than estimated nutrition requirement for non pregnant women which is less in first trimester. As per the modern science there are lot many nutritional deficiencies occurring in second trimester which causes serious health hazards in mother as well in fetus. The main deficiencies in second trimester of pregnancy are protein, folic acid, calcium, iron, vitamin D, thiamine, vitamin A.

Ancient *Ayurveda* prescribes some set of guidelines which can help make this time more easy for the women. *Ayurveda* has given proper regimens of diet and life style in during different stages of pregnancy. This paper talks about second trimester of pregnancy because in this all organ starts to appear according to *Ayurvedic Samhitas* and modern aspects also. It is given in *Mansanumasik Garbhini Paricharya* which is mentioned in *Ayurvedic Samhita*, the regime for the pregnant women. It is similar to the modern science diet to the pregnant women. Therefore this is a small effort to find out the exact concept of *Garbhini Paricharya* given by *Aacharya sushruta* is nutritionally a complete supplement for *Garbhini*.

KEYWORDS: *Garbhini Paricharya*, Nutritional requirement, Nutritional deficiencies.

INTRODUCTION

A healthy pregnancy is without physical or psychological pathology in the mother and result in the delivery of healthy baby. The hormonal changes in pregnancy are important for maintaining the flow of nutrients to the fetus. One in three women in India 15-49 yrs of age group has a body mass index below 18.5 indicating severe nutritional deficiency and under nutrition. That indicates severe nutritional deficiency in pregnant women in India. The main deficiencies in second trimester of pregnancy are protein, folic acid, calcium, iron, vitamin D, thiamine, vitamin A^[2].

Dietary regimen in pregnancy is one of the most essential aspects which should be taken care of; as the growth of the fetus solely depends upon the health and nutrition of the mother. According to *Ayurveda* the *Ahararasa* i.e., nutrition or energy obtained from the pregnant mother's diet serves three important functions that is firstly nourishment of the mother herself, nourishment and growth of the baby and lastly preparation for *Stanya*, i.e., breast milk. There is an increase need of balance diet with good nutritional value during pregnancy. Any negligence or deprivation in nourishment may affect physical and mental growth of the fetus or either led to miscarriage, premature delivery, or an underweight baby. *Ayurveda* recommends including few things in diet corresponding to month of pregnancy which adds to the healthier development of the fetus.

Aims

The study of nutritional requirements in second trimester W.S.R. *Garbhini Paricharya*.

Objective

- 1) To collect and analyze the *Mansanumasik Garbhini paricharya*.
- 2) To collect and analyze the Diseases and disorder occurs due to nutritional deficiencies in second trimester of pregnancy
- 3) To collect and analyze the nutritional supplements essential in pregnancy
- 4) To compare the *Vikrutis* occur in second trimester as per *Samhita*
- 5) To collect and analyze Management of nutritional deficiencies as per *Ayurvedic* references.

Methodology

To fulfill the aims and objectives of the study this work has been carried out in the following phase wise manner.

- 1) Conceptual study
- 2) Comparative study
- 3) Discussion
- 4) Conclusion and summary

Prevalence rate

WHO in their review of nationally representative survey from 1993 to 2005 reported that 42% of pregnant women are anemic globally. In the entire world the

prevalence rate of anemia is highest in India. Indian diets usually lacks in iron, folic acid, vit.B12 because of low vegetable consumption and poor bioavailability from fiber phytate rich food [21]. One in three women in India 15-49 yrs of age group has a body mass index below 18.5 indicating severe nutritional deficiency and under nutrition[3].

Conceptual study

A) *Mansanumasik Garbha Vriddhi as per Sushruta Samhita* [4]

1) Fourth month - various body parts become more conspicuous and stability to the fetus comes in this month. Manifestation of heart and consciousness associated with heart also comes in this month according *Sushruta*.

2) In fifth month- *Manah* becomes more enlightened. Also consciousness develops in this month.

3) In sixth month - *Aacharya Sushruta* opines that more enlighten of *Buddhi* (brain).

B) In second trimester following development occurs in fetus[5]

1)13 weeks- Thirteen weeks or after 11 weeks of conceive baby's intestine have returned to abdomen from the umbilical cord. Baby also starts to form urine and discharge it into the amniotic fluid. Tissue that will become bone is also developing around baby's head, arms and legs

14 weeks - Baby's sex becomes apparent. Baby's neck become more defines. For girls ovarian follicles begin forming and for boys prostate appears.

15 weeks- In this week, baby's skeleton gets developing further, which then gets visible on ultrasound images

16 week- Baby can make sucking motions, eyes have begun to face forward and slowly move. The ears are close to reaching their final position.

17 week-Fat accumulates in baby's body. Toenails have begun to develop. Soon fat stores begin to develop under skin. The fat will provide energy and help to keep baby's warm after birth.

18 weeks-Baby begins to hear. Baby's ear begins to stand out on the sides of his or her head.

19 week- A greasy cheese like coating called vernix caseosa begins to cover baby. The vernix caseosa helps to protect baby's delicate skin from abrasions, chapping and hardening that can result from exposure to amniotic fluid. For girls the uterus and vagina might begin to form this week.

20 week- In this week, mother might be able to feel baby's movement also known as quickening.

21 week- Baby can swallow. Baby is poised to gain more weight.

22 week- Baby's hair becomes visible. Baby is completely covered with a fine down like hair called lanugo. The lanugo helps hold the vernix caseosa on the skin.

23 week- Fingerprint and footprint are form. In this week baby's skin is wrinkled, more translucent than before and pink red in color. Baby has rapid eye movements. Baby's tongue will soon develop taste buds. For boys, testes are descending from abdomen.

24 week - Real hair grows. In this week baby is regularly sleeping and walking. Real hair is growing on his or her heads.

25 week- Baby responds to voice.

C) *Vikriti occurring in Garbha in second trimester as per Sushruta Samhita*[6]

1) *Sushruta* has mentioned that non fulfillment of desires produces the fetus which is hump back, crooked armed and legged, idiot, dwarf, disc- shaped eye or has absence of eyes. What so ever she desires should be fulfilled due to fear of fetal abnormalities. Non fulfillment can harm both mother and fetus; especially suppression of desires related to specific *Indriya* produces abnormalities of corresponding *Indriya* of the fetus.

2) *Garbhastrav* and *Garbhaapata*

Expulsion of fetus from early stage to second trimester is the main clinical features of *Garbhastrava*.

3) When the fetus starts its slight descent for expulsion, there is pain along with burning sensations in flanks and back, excessive bleeding etc.

D) *Congenital deformities due to nutritional deficiencies*[7]

1. 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.

2. **Congenital heart disease:** mother who 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.

3. **Gastroschisis:** The diet devoid of protein, zinc and many such nutrients lead in the deformity of infant. This condition is known as Gastroschisis. In such case infant's abdominal wall has a fissure or tear.

4. **Congenital diaphragmatic hernia:** woman whose diets are low in vitamin B12, vitamin E, calcium, retinol, selenium are at risk for having a child with congenital diaphragmatic hernia resulting in the contents of the abdomen protruding into the thoracic cavity.

5. **Cleft 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's diet are associated with isolated cleft palate.

E) *Mansanumasik Garbhaaini Paricharya* [6]

Aacharya Sushruta advice the following diet to be prescribed to the *Garbhini* of second trimester.

1) In fourth month -Cooked *Sasti* rice with curd, dainty and pleasant food mixed with milk and butter and meat of wild animals.

2) In fifth month -Cooked *Sasti* rice with milk, meat of wild animals mixed with milk and *Ghruta*.

3) In sixth month- (*Gokshur Siddhakshiryavagu*) - *Ghruta* or rice gruel medicated with *Gokshura*.

F) Functions of nutrient in development of fetus^[8]

1) Protein- The amino acids that make up protein are the building blocks of your baby's body as well. It's important to get enough protein throughout pregnancy especially for 2nd and 3rd trimester. Proteins not only repair muscle tissue but also red blood cells protein play a huge role in hair and fingernail growth along with regulation of hormone secretion

Water soluble vitamins

2) Vitamin B1- (Thiamine)

It helps to convert carbohydrate into energy. It also helps in development of nervous system, muscles and heart function normally and essential for baby's brain development.

3) Vitamin-B2 (Riboflavin)- It promotes baby's growth, good vision and healthy skin. Riboflavin is essential for baby's bone, muscle and nerve for development. Deficiency of riboflavin causes preeclampsia.

4) Folic Acid- It can help to prevent birth defects of baby's brain and spinal cord. Folic acid is a manmade form of vit-B9 called as foliate. It plays an important role in production of RBC. It helps baby's neural tube develop into her brain and spinal cord and Birth defects occurs within first 3-4 weeks of pregnancy. Due to deficiency of folic acid - cleft lip and palate, premature birth, low birth weight, miscarriage, pregnancy complications, preeclampsia may occur.

5) Vitamin C-It's necessary for the body to make collagen, a structural protein that's a component of cartilage, tendons, bones, skin. It is also essential for bone growth, tissue repair, and healthy skin.

Fat soluble vitamins-

6) Vitamin- D-It is needed to maintain proper level of calcium and phosphorus which help to build baby's bone and teeth. Vitamin - D deficiency caused to abnormal bone growth, fractures or rickets in newborn. Also a gestational

diabetes, preeclampsia, preterm birth, LBW, also achy muscles, weakness, bone pain, softened bones.

7) vitamin A-It is required at the time of formation of the primitive heart and circulation, and the development of the hindbrain, a period that corresponds to 2-3 weeks. Without vit-A, the embryo succumbs to gross abnormalities of heart and is aborted. It also play a key role in development of visual system-the retina, the inner ear, the spinal cord, pharyngeal and bronchial arches and the thymus, thyroid and parathyroid glands. During mid gestations, vitamin A is required for fetal lung development.

8) Vitamin E- It protects the body's tissue against free radicals, as an antioxidant.

Minerals

9) Calcium -Developing baby needs calcium to build strong bones and teeth. Calcium also helps to grow healthy heart, nerves, and muscles as well as to develop a normal heart rhythm and blood clotting abilities. If mother cannot get enough calcium then baby will draw it from mother's bone, health disorders occurrence in such cases like osteomalacia, hypertension, preterm labor etc.

10) Iron -It is essential for making hemoglobin. It is important component for myoglobin, collagen and many enzymes. Need of extra iron for growing fetus and placenta especially in the second and third trimester.

Copper

Copper helps to form baby's heart, blood vessels, skeletal and nervous system.

Zinc

Zinc, a mineral plays an essential role in the construction of baby's cells and DNA during pregnancy. It is needed for cell division and tissue growth, supporting normal development.

Phosphorus

It is important for muscle contractions, blood clotting, kidney function, nerve conduction, tissue and cell repair.

G) NUTRIENT REQUIRED IN PREGNANCY

NORMAL VALUES REQUIRED IN PREGNANCY ^[8]

Energy	Vitamins		MINERALS
Protein- 1.1g/kg/day	Thiamin- 1.4mg	Vitamin A-770ug	Calcium -1200mg
Fatty acid-omega3-	Riboflavin -	Vitamin D-5ug	Copper -1.3mg
Carbohydrate- 260g/ day	Niacin -20-60 mg	Vitamin E- 15 mcg	Fluoride -3.0 mg 360 mg Magnesium-360 mg
Dietary fiber- 28 g/ day	Vitamin B6 -2 mg/day	VitaminK-1 mcg/kg/day	Iodine -220ug
	Biotin - 35 to 60 mcg/day	VitaminB12- 2.4ug/day	Iron - 27mg/day
	Choline- 450mg	Folic acid-600 ug/ day	Phosphorus -1250mg
	Vitamin C-		Zinc - 11mg / day

H) INDIVIDUAL VALUES OF DIETARY PRODUCTS INCLUDED IN GARBHNI PARICHARYA GIVEN BY SUSHRUTA COMPOSITION OF MILK (per 100 ml)^[9]

Milk fat- 4.0g	Potassium - 35mg	Vitamin k-6.0ug
Phosphorus - 90mg	Vitamin C -1.2-1.5mg	Vitamin D-0.5-4.5i.u.
Calcium - 140 mg	Lactose -7.4gm	Vitamin A- 70-220 i.u.
Iron- 0.29-0.45mg	Chloride- 29 mg	Folicacid-0.010.38mg
Protein -3.5gm	Sodium- 25mg	VitaminB ₁₂ -0.07-1.15

Minerals in traces like copper and iron

COMPOSITION OF GHREET [10]

Vitamins D	Copper	Arachnoid acid
Manganese	Selenium	Conjugated linoleic
Chromium	Omega 3	Glycosphingolipids
Zinc	Omega 6	

COMPOSITION OF RICE [11]

Content per 100 gm

Energy - 1461 kg (344 cal)	Manganese- 2 mg	Iodine - 50 ug
Protein - 6.85gm	Iron - 600 ug	Selenium- 10-70 ug
Lipids - 0.6 gm	Calcium- 6 mg	Vit E- 70 ug
Carbohydrate - 77.8gm	Copper- 130ug	Vit B1- 60 ug
Fiber - 1.4gm	Zinc- 500ug	Vit B2- 30 ug
Sodium - 6 mg	Phosphorus- 120 mg	Folic acid- 30 ug
Potassium - 103mg	Fluoride- 50 ug	Biotin - 3 ug

COMPOSITION OF CURD [12]

Protein	Calcium	Vitamin D
Fat	Phosphorus	Vitamin c

COMPOSITION OF GOKSHURA [13,14]

Extract of the powdered fruit was found to contain an alkaloid, a resin, fat, and minerals matter.

HARMAN- it is a beta carboline alkaloid. Its act as monoamine oxidase inhibitors; Which is used for the treatment of depression and also in treatment of Parkinson's disease.

SAPONIN-Saponins are one of the most numerous and diverse groups of plant natural products. It reduces cholesterol and reduces risk of heart disease. It improves immune function- eating more saponins may boost immune function and fight off fungal infections.

COMPOSITION OF MEAT [15]

Fat- 2.58 g	Saturated fat- 0.79g	Protein- 23g	Iron - 3.2g
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COMPARISON OF STUDY

As per embryological developments of baby in second trimester of pregnancy week by week are sex apparent, intestine descends in abdomen, skeleton is developed, baby can make sucking motions, ears stand out baby can hear, vernix caseosa formed, hair becomes visible, real hair also grows. The baby at this stage starts building up muscles, blood, all the five senses, skin, hair, fingers, veins, nails, teeth, bones, eyelids, mind, and he/she becomes even stronger at this stage. (as per *Samhita*) At this junction you may face challenges like constipation, stretch marks, anxiety, nervousness, nightmares, and few more. *Ayurvedic Garbhini Paricharya* and nutritional supplements advised in second trimester of pregnancy. The regimen describe in second trimester fulfill all the requirement of protein, carbohydrate and vital nutrients. Therefore it is very essential to have a sound knowledge of *Garbhini Paricharya*.

Acharya Sushruta says that all organs start to appear in second trimester and *Garbhini Paricharya* describe in this fulfill all the nutritional components required for proper development of organs. For example composition of *Ghrith* contains omega 3 and omega 6 fatty acid which are required for development of brain and

heart muscles. So for comparison, instead of market made nutrient supplement natural products should be consumed which are mentioned by our *Acharyas*.

DISCUSSION

In *Ayurvedic* text like *Charak Samhita*^[16], *Sushruta samhita*, *vagbhat Samhita*^[17], *Harita Samhita*^[18] and *Bhel Samhita*^[19] mentioned the detailed description about the *mansanumasik garbha vridhi*, *Garbhini Paricharya*, and *Vikrutis* in *Garbha*. But there is difference of opinion of all the *acharyas* about the monthly diet regime.

Therefore this is a small effort to find out the exact concept of *Garbhini Paricharya* given by *Acharya Sushruta* is nutritionally a complete supplement for *Garbhini*. So that it is helpful for physicians, *Ayurvedic* practitioner to advise the dietic regimen.

Nutritional congenital disorder found in neonates or fetus can be prevented by following *Garbhini Paricharya* as per *Ayurveda*. In present era, numbers of women population are malnourished due to faulty food habit.

SUMMARY

Introduction which is the preface of an article includes general idea regarding nutritional deficiencies in second trimester and its management.

The aims and objectives are mentioned.

Literary review is explained in details which include:

- 1) Concept of *Garbhini Paricharya*
- 2) Nutritional deficiencies found in second trimester
- 3) *Vikrutis* occurs in fetus due to improper *Aahara*.
- 4) It is therapeutic study on the basis of previous work done.

CONCLUSION

- 1) Some similarities observed between *Ayurvedic Garbhini Paricharya* and nutritional supplements advised in second trimester of pregnancy.
- 2) A healthy pregnancy is without physical or psychological pathology in the mother and result in the delivery of healthy baby. And that can be achieved by having *Masanumasik Garbhini Paricharya* described in *Samhita granthas*.
- 3) The abnormalities or birth defect found in second trimester are due to faulty food habits and carelessness in mother diet as well as in lifestyle.

- 4) It is very essential to have a closer watch over nutrition of mother and so as of the child to have healthy babies.
- 5) Hence it is concluded that the diet and *Paricharya* described in *Samhita* are very essential to follow for healthy babies.
- 6) In market there are various kinds of artificial nutritional supplements available in the form of medicines; which create complications in mother or in fetus. For example regular iron intake causes constipation; also some women suffer from allergic reaction of vitamin B complex. According to the demand of population there will be more adulteration in these supplements but there is no any adulteration in natural homemade regimen. So it is always better to follow *Garbhini Paricharya* stated by *Sushruta* inspite of those artificial supplements.
- 7) It can be conclude that lack of dietary supplements and improper maternal nutrition leading to birth defect in fetus which structural or functional abnormalities are causing physical and mental disabilities.

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