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A Critical Review on the Concept of the *Garbhanga Vikruti* with special reference to Teratogenicity

Prathviraj Puranik, VNK Usha¹, B Ravishankar²

Ph.D. Scholar, Prof. and Head Department of PG studies in Kaumarabhritya, ¹Professor and Head Department of PG Studies in Prasooti Tantra & Stree Roga, SDM College of Ayurveda, Kuthpady, Udupi, ²Research Officer, Department of Pharmacology & Toxicology, SDM Centre for Research in Ayurveda and Allied Sciences, Kuthpady, Udupi, India.

ABSTRACT

The health of the nation depends on the health of its citizens. Despite the advancements in diagnostic techniques and therapeutic interventions, medical science has failed to keep the incidence of congenital malformations under control. Throughout the history, the birth of malformed infant features has been well documented. Data reveals that 3 to 5% of all births result in congenital malformations, 20 to 30% of all infant deaths are due to genetic disorders and 30 to 50% of post-neonatal deaths are due to congenital malformation. Ayurveda, the ancient Indian system of medicine has given due emphasis on the six procreative factors (*Shadbhavas*) such as *Matruja*, *Pitruja*, *Aatmaja*, *Rasaja*, *Satmyaja* and *Sattvaja Bhavas*. The combinations of these factors give *Shreyasi Praja*. The physical, mental, social, and spiritual well-being of the person, proper nutrition of the mother during pregnancy and practice of a wholesome regimen, plays a prime role in achieving a healthy offspring, thus structuring a healthy family, society and nation. Negligence to any of these factors will be the main source of unhealthy and defective child birth. The present conceptual study focuses mainly on interpreting Ayurvedic observation on *Garbhanga Vikruti* with the modern scientific knowledge.

Key words: *Garbhanga Vikruti*, *Shreyasi Praja*, congenital malformations, Teratogenicity.

INTRODUCTION

The ultimate aim of the conception is to get *Shreyasipraja* (good progeny). Most of the children are born normal; however, there are some children who may have born with some obvious or hidden anomalies. Teratological or congenital anomalies are defined as 'gross structural defects' present at birth.

Address for correspondence:

Dr. Prathviraj Puranik

Ph.D. Scholar, Prof. and Head, Department of PG studies in Kaumarabhritya, SDM College of Ayurveda, Kuthpady, Udupi-574118.

E-mail: drprathvirajpuranik@gmail.com

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Despite the advancement in the diagnostic techniques and therapeutic intervention, medical science has failed to keep the incidence of the congenital malformations under control. Throughout the history, the birth of malformed infant features has been well documented and the attitude towards the infants and parents varied according to the cultural state of people and range of admiration to rejection and hostility. Advanced modern medical science even though has extended the life span of the humans, the rate of inborn defects in the newborns is increasing. This is posing a challenge to the aim of a healthy society.

Data reveals that 3-5% of all birth is as a result of the congenital malformation,^[1] 20-30% of all infant death is due to genetic disorder^[2] and 30-50% of post neonatal death is due to congenital malformation,^[3] 11.1% of pediatric admissions are with genetic disorders, 18.5% children are with congenital disorders.^[4]

The above data are sufficient to awaken our conscience to introspect and to find out the exact reason for the fail in reduction of the infant morbidity and mortality. The prevalent health vision of the modern science and its adverse drug reaction has attracted the population worldwide towards the holistic health approach of the Ayurveda, which was visualized thousand years ago. It emphasis strongly on the concept of *Shreyasipraja*.

With this background of the gravity of congenital defects, a conceptual study was planned as follows:

OBJECTIVES OF THE STUDY

To study the concept of *Garbhavikruti* and teratogenicity and to suggest a protocol for the prevention of the same.

MATERIALS

Classical literature of Ayurveda as well as modern medical science on the subjects of Gynecology / Obstetrics and genetics were taken for the study. And also the e-journals were used. The data obtained were critically reviewed.

METHODS

This present literary / conceptual study focuses mainly on interpreting and analyzing the explored literature.

Ancient scholars were very much curious to know the causes for the teratological anomalies. *Vedas*, *Brahamana Granthas*, *Upanishads*, *Smritis* and most of the Ayurvedic texts have reference concerned to these problems. *Punarvasu Atreya* have elaborately explained in the *Charaka Samhita* that the abnormalities of the *Bija* (ovum and sperm), *Atma Karma* (deeds of previous life), *Ashaya* (uterus), *Kala* (time factor or abnormality of *Ritukala*), dietics and modes of life of the mother are the factors which may influence the growing foetus.^[5] *Acharya Susruta* has described that any disease may produce by any one or combined with the following seven cause like *Adibala Pravrutta*, *Janmabala Pravrutta*, *Dosabala Pravrutta*, *Sangatabala Pravrutta*, *Svabhavabala Pravrutta*, *Kalabala Pravrutta*, *Daivabala Pravrutta*.^[6] Out of

these, congenital malformations are caused by *Adibalapravrutta* and *Janmabalapravrutta* factors.

Various factors responsible for teratological malformations are discussed as follows;

Defects in Bija (*Arthava* and *Sukradusthi*)

Beeja refers to *Shudda Shukra* and *Shudda Artava*. The characteristics of offspring will be decided by the *Beeja Bhaga* of *Beeja* (*Shukra* and *Artava*), which will be influenced by *Rasa* and *Vata*. The *Sukra* which is vitiated by *Dosha* is called *Shukradusthi*. It includes abnormality in form of sperm that is too large and too small. The characteristic of offspring will be decided by the *Beeja Bhaga*. The head, body, tail may be duplicated, or it may be teratozoospermia, necrozoospermia. *Acharaya Charaka*, *Sushruta*, *Vagbhata* have enumerated 8 types of *Shukra Dusthi* which includes *Vataja*, *Pittaja*, *Kaphaja*, *Vivarna* (*Charaka*), *Shonita* (*Sushruta*), *Kunapagandhi*, *Puya Gandhi*, *Ksheena*, *Mutrapurisha Gandhi* (*Charaka* and *Susrutha*). *Artava* in the same way gets vitiated by *Doshas* producing 8 types of mensutal disorders (*Vata*, *Pitta*, *Putipuya*, *Granthibhuta*, *Kunapa*, *Mutrapurishaganthi*).^[7] *Shonita Dusti* may leads to genetically determined female infertility. Chromosomal abnormalities like gamete abnormality seen in Down's syndrome, Klinefelters syndrome, Turner's syndrome etc. can be considered in *Beeja Dusti*.

Atmakarmadosa (Previous deeds of life)

It has been recognized very well by the *Ayurveda* that unreligious and forbidden acts of prior existence are the causes of some specific diseases. *Susrutha* has shown this relationship between congenital malformation and previous acts of the parents and also child, the fetus may have the shape of snake, scorpion or field pumpkin.^[8]

Susrutha defines the *Adiblapravrutta* diseases as the diseases those produced by improper conduct of the mother and father (*Shukrashonitadushya*) producing diseases like *Kushta*, *Arshas* etc. These *Vyadhis* are further divided into *Matruja* and *Pitruja Vyadhis*.^[9]

Therefore, malformations of the child should be considered due to evil deeds of his parents, or to the effect of his own bad deeds in prior existence or to the aggravated condition of vitiated humours.

Kala Dosha (time factor)

The word 'Kala' has been interpreted in many ways by Ayurvedic scholars. *Acharya Kashyapa* mentions the *Kala* to be considered as *Pusphakala* (menstrual period), *Bijakala* (ovulation period) and *Garbhavasthakala* (gestational period).^[6] Certain rules were mentioned in Ancient period, to be followed during these three periods if not, it may cause bad effect on the growing fetus.

Charaka has explained the fact that if woman with the age below 16yrs is impregnated by a man below 25yrs, either the woman will not conceive or she will have intrauterine death or the life span of delivered child shall be shorter and will have weaker organs, ill health and deformed parts.^[7] Modern medical science also accepts the effect of maternal age on fetus. Premature births are relatively among very young women, all trisomy (Downs syndrome etc.) are found to have significant relationship to increased maternal age.

It has been advised that a man should not perform coitus with his wife during *Ritukala*, especially in the first three days because conception during these days may result in defective or even dead child. It is said that improper *Ritumaticharya* can also cause congenital malformation due to hormonal imbalance, which may leads to IUD, Premature delivery.

Asayadosha (defective genital organs)

Any defect in the *Asaya* (especially uterus) may cause congenital malformation in fetus.^[8] Environment of the fetus may be changed due to the defects in the genital organs including uterus, liquor amnii causing fetal congenital anomalies. For example: abnormalities in uterus can cause Talipes equinovarus, oligohyromnios may be associated with renal agenesis and obstructive uropathy. Polyhydromnias may be associated with Open neural

defects, encephaly, ectopia vesicae, oesophagial / duodenal / jejuna atresia, Hydrops fetalis.

Effects of dietetics and mode of life during pregnancy

Among the five types of *Mahabhoota*, that constitute human body, four *Mahabootas* are supplemented by nutrient fluids from mother continuously, thus promoting the growth of embryo.

The fetus is wholly depends on mother, therefore her diet, mode of living and other activities may affect the growing fetus during pregnancy. *Charaka Samhita* has mentioned the effects of harmful diet as well as activities of the mother, causing congenital anomalies e.g. a woman, who sleeps too much, gives birth to insane child. Use of *Vata* vitiating diet can cause Mental retardation, deaf and dumb child, Use of *Kapha* vitiating diet can cause atopic dermatitis like condition in the children or genetically presence of teeth.^[9]

Role of Vata in congenital disorder

Vata represent cell division, *Vatika* declaration may lead to anaphase lag. The common error of cell division during meiosis leads to abnormal chromosomal numbers ex. Non dysjunction, anaphase lag. *Vatika* vitiation may leads to *Heenanga* and *Adhikanga*, which can be considered either with visible congenital anomalies likes Polydactyl or absence of visible body part. *Sushruta* grouped blindness, lame, deafness etc. under congenital abnormalities due to vitiation of *Vata* disorders.

Exposure to mutagens leads to mutations and occurs through errors in DNA replication and repair. Such DNA replication can be considered as *Vatika* vitiation which in turn leads to congenital anomalies.

Effect of psychology of the woman on the fetus

The psychology of the pregnant woman may also affect the fetus growing in her womb. *Vedas* considered the fact that for achievement of conception, happiness or good psychology of woman is an important factor. In *Garbhopanishat* also, the importance of normal psychology of woman is considered, as psychological abnormality of mother

results in birth of blind, dwarf or hump backed child.^[10] Ayurvedic texts have stressed on *Dauhrida* concept, the word *Dauhrida* means desires of fetus expressed through mother. The non fulfillment of the *Dauhrida* can lead to *Khanja* (abnormality of one leg) like that of congenital talipes equinovarus, *Kubja* (Kypho scoliosis), *Jada* (Mental retardation) etc.^[11]

Role of diet of the pregnant woman on the fetus

The food also affects the genetic material deciding the traits of human beings, hence some of the diseases can be treated by change in the diet etc. A diet free of phenylalanine is given to patients of phenyl ketonuria. Rich in Vitamin C and folic acid food in pregnancy helps in genetic defect in Vitamin C synthesis and spina bifida. Over satisfactory diet may excessively increase the body weight of mother and fetus, over eating is one of the causes of pregnancy toxemia, which may leads to IUGR baby.

Protocol for prevention of Garbhanga Vikriti

The preconceptional care is one of the important measures to prevent the *Garbhanga vikruti* or teratogenicity. It maintain the state of equilibrium in *Doshas*, *Dhatu*s and *Mano Guna's* with the help of *Snehana*, *Swedhana*, *Vamana*, *Virechana*, *Basti* (*Nirooha*, *Anuvasana*, *Uttarabasti*) and food regimen. It also helps in early identification of high risk factor and prevents the adverse effect of that. As there is increasing incidence of congenital anomalies and prenatal deaths. In such situation Ayurveda can contribute tremendously with the effective pre conceptional care and Antenatal care. The precautionary preconceptional care mentioned by our *Acharyas* includes selection of the partners i.e. *Athulyagotriya Vivaha* and age of marriage is very important as in consanguineous marriage, there may be chances of *Prameha*, *Kustha*, *Arshas*. Recent updates also say consanguineous marriage carries recessive trait.^[12]

During early embryo genetic periods most important and vital organs will be produced and any insult during this time may end up in anomalies. Diet explained like black gram is rich source of folic acid

which is required to prevent the neural tube defects, it act as potent anti-oxidants, helps to reduce oxidative stress, it also contain proteins and fibers. Rice contains more of carbohydrates and rice bran contains vitamin B complex which is easily digestible. *Ksheera* or milk mentioned during the *Masanumasikaparicharya* is important source of calcium. Also, *Ghrutha* mentioned during the *Garbhiniparicharya* contains omega 3 fatty acid which is required for the brain development etc.^[13] *Pumsavana Karma* advised to get healthy ovum give rise to healthy progeny. *Uttarabasti* helps to cure the *Ashaya Dosh*a and helps in proper development of the fetus in uterus.

Prevention of the *Garbhoghatakarabhavas* like alcohol consumption are also an important precautionary measures during preconceptional care, as this affect the sperm motility, quantity, count. It also depletes the zinc level in the body in males and in females it affects the ovulation and menstruation effecting the pituitary ovarian dysfunction. In new born it may cause fetal alcohol syndrome related to physical and neurodevelopmental birth defects.

CONCLUSION

The above description of the congenital malformation or *Garbhanga vikruti* indicates that there was a concept of the congenital malformation in the *Vedic period*, however, Ayurvedic texts have given a detailed description of etiology of various malformations found in fetus. The concept of hereditary (*Sahaja*, *Adhibalapravrutta*), congenital (*Garbhaja*, *Janbalapravrutta*) and familial (*Kulaja*) diseases was clear. The modern science also recognizes these three i.e. *Adhibalapravrutta*, *Janmabalapravrutta* and *Kulaja* signifies conditions transmitting through defects in DNA of genes. Congenital, implies the abnormalities present at birth, but not necessarily transmitted through genes, whereas familial denotes that the disease may be present in many members of the family. Psychology and daily routine of woman during or even before pregnancy is very important factor. These factors may affect the fetus anatomically and psychologically.

Along with these, many factors may also interact with the differentiating and growing embryo. So proper care through the preconception as well as during the conception time mentioned in the Ayurveda not only prevents the malformations, but also provides a strong healthy progeny.

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