

GENETIC AND ENVIRONMENTAL BASIS OF DISEASES: AN AYURVEDIC PERSPECTIVE

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ABSTRACT

At the time of fertilization male and female gametes fuse to form the zygote and then embryonic development takes place followed by fetal development. These gametes or its part responsible for production of particular body part of fetus, if get afflicted give rise to defective body part of that particular counter part in developing fetus. Genetic makeup and environmental influences determines phenotype of individual in physiological as well as pathological state both. Various regimens and code of conduct is mentioned in classical text of *Ayurveda* prior to conception, during pregnancy and even in reproductive life for attainment of best quality of gametes which later produces healthy progeny. Description of different *charyas* has been quoted to establish the relation between genetics and environmental condition in causation of disease. These *charyas* are *rajaswala charya* (regimen to be

followed by menstruating women), *ritumaticharya* (regimen to be followed by women during fertile period of menstrual cycle), *atulyagotriya vivaha* (avoiding marriage between close relatives), *garbhadhana sanskar* (regimen to be followed during impregnation), *punsavan sanskar* (act to achieve the best progeny), *samanya garbhini paricharya* (avoidance of *garbhopghatkar bhava* i.e., hazardous conducts, diet and drugs and adoption of *garbhkara bhava* opposite to *garbhopghatkara bhava*), *vishishta garbhini paricharya* (monthwise specific dietary regimen), and *raksha vidhana* (to prevent the neonate from *grahaavesha* i.e, invisible microbial infection).

KEYWORDS: *Genetic, Environmental, Ayurvedic, Diseases, Consanguinity, Garbhadhana.*

INTRODUCTION

It had been a topic of regular acceptance and rejection since a very long time, whether the diseases have any genetic basis of origin or not. Now, it is accepted up to a very much extent that most of the disease have probable Genetic and Environmental basis. Manifestation of disease may totally depend up on genetic component or it may only act as aggravating factor in response to other etiology. Not only this, affliction of any disease lie at different regions of spectrum between genetic and other factors responsible for disease production. Like many theories and principles, genetics too had its footsteps crafted beautifully in ancient Ayurvedic text.

A particular code of conduct does and don'ts had been described for female of fertile age groups. It has been described that from the day of onset of menstruation the lady should observe chastity; should avoid sleeping in day time, application of collyrium, shedding of tears, ablution, bathing, anointing, massaging, paring of nails, fast racing, laughing, talking (too much), listening of so many types of topics, combing and fast winds as well as excessive exercise.^[1] She should sleep on the bed made of *darbha* (specific sacred leafy plant) spread over around she should eat *havisya* (meal made of ghee, shali rice and milk) or *yawaka* (meal made of barley and milk) keeping the same directly over palm or in a utensil made of clay or leaves or unbroken utensil held in hand.^[2] She should not adorn herself with ornaments. Use of *nasya* (inhalations),^[3] *swedana* (sudation)^[4] and *vamana* (emesis)^[5] are contraindicated during this period. In order to get her body slightly emaciated and digestive system purified, she should take less quantity of meals. She should avoid pungent (*tikshana*), hot (*katu*) and salty (*lavana*) substances; always concentrate on thinking good or auspicious things.^[6] On fourth day after use of unguents, should take bath washing her head also, wear white or new garments alongwith garland of flowers and ornaments etc., then with the enchantation of religious or pious hymns, should first of all see her husband and both should wear white garments.^[7]

Kashyapa advises that the lady should cover herself inside the bath room itself and without looking all around enter the place of god with pious feelings; should worship the oblation fire with rice and ghee and after looking at *Brahmanas*, God, *Vishnu* and *skanda* etc. should perform obeisance to them, should not salute *preta*, *pishacha* or *rakshasas*.^[8] Not even this, consequences due to non-avoidance of above mentioned restricted act is described. For

example if the menstruating woman does not avoid earlier described acts due to ignorance, neglect, greed or fortune, the doshas get vitiated and reaching to the fetus would produce many abnormalities such as day sleeping causes over sleepy fetus, use of collyrium results in blindness, weeping causes abnormality of vision of the fetus, bathing & anointing will have saddish impact over the child, oil massage will cause skin disorder in fetus, paring of nails causes deformity of nails, fast racing will cause wanton or fickle etc.^[9,10]

Acharya Charaka has documented the facts about avoidance of consanguinity. *Atulyagotriya Adhyaya* deals with avoidance of marriages between two similar 'Gotras' (close relatives). Such type of marriages will lead to congenital anomalies in offspring.^[11] The child will have similar physical and psychological characteristics to whom-so-ever the lady sees, remembers or thinks, after taking her bath on fourth day of menstruation. That is why she should first of all see her husband or else the son, kith and kin, god, cow, *brahman*, teacher or old persons etc.^[12] The child will also have similar *satwika*, *rajasika* or *tamasika* nature as that of, which is dominant in mother after menstruation. If the couple (during coitus) is happy, the born child would be *satwika*, if worried then *rajasika* and if sorrowful then child will be of *tamasika prakriti*.^[13] Effects on the child impregnated on First day of menstruation results in no pregnancy or pseudocyesis or intrauterine death or death immediately after delivery. On the second day of menstruation if conception occurs, it will either abort or intrauterine death or death immediately after birth or within few days of delivery will occur. Conception on the third of menstruation will give rise to deficient or defective body parts and would be short lived. On the fourth day if the conception takes place fetus will have all body parts, normal and will be healthy.^[14]

Very young or old woman should not be impregnated. If a woman below sixteen is impregnated by a man of below twenty five, either she will not conceive, or if at all conceives, she will have intrauterine death of the fetus; if the child is born, it would not live long or will have weak organs, ill health, deformed body parts etc. Aged woman also should not be impregnated.^[15] The coitus should not be done with a woman having done over eating or who is hungry, thirsty, frightened, averse, sorrow-stricken, angry, longing someone else, having absence or excessive desire for sex, fatty, chronically ill specially suffering from gynecological disorders or menorrhagia, menstruating, pregnant, emaciated or weak, dirty, unloving, elder and coming from higher caste, possessing less body-parts, jealous, belonging to one's own *gotra* (subcaste), wife of teacher and a female ascetic. These types of women

either do not conceive, if conceive then the born child suffers from teratologic abnormalities the man having gone to such woman loses his energy and health. Coitus should also not be done during twilights, festival days, early morning, midnight, midday and improper place likely to cause embarrassment, open or unclean place. The man doing coitus with above contraindicated woman or place suffers from different disorders, which are not described here. The coitus done with pregnant woman will cause troubles to her fetus.^[16] By observing this specific mode of life (during menstruation and *putriya yagya* etc.) the born children will be handsome, endowed with goodness, will have long life, repay the debts of parents and are excellent; the couple respecting or worshiping deities and *brahamanas*, observing chastity and using beneficial dietetics give birth to the child possessing all good qualities, while having opposite deeds deliver the child devoid of good qualities.^[17,18]

Due to the abnormalities of *beeja* (ovum and sperms), *atmakarma* (deeds of previous life), *ashaya* (uterus), *kala* (time factor or abnormality of *ritukala*) and dietetics alongwith mode of life of mother, the vitiated doshas produce abnormalities of fetus, affecting its appearance, complexion and *indriyas*.^[19] The aggravated doshas situated in *kukshi* (uterus) disfigure the fetus. Abnormalities of *shukra*^[20] and *vayu*,^[21] as-well-as vitiated *vayu* located in *sukra*^[22] are also said to produce congenital anomalies. *Acharya Charaka* has explained further that teratologic abnormalities depend upon the condition of *beeja*, the part of *beeja* which is defective, the body part developing in the fetus from that portion of *beeja* will be abnormal. Any organic abnormality cannot occur without abnormality of corresponding portion of particular *beeja* concerned. Thus if the portion of *beeja* of a *kushthi* (leprous) man responsible for formation of skin is defective then only the born child will have *kushtha*, however, if that part is not abnormal then the child will be healthy. All the *indriyas* are derived from *atma*, thus their presence, absence or abnormalities depend upon the fate. An mentally handicapped or blind father does not always produce mentally handicapped or blind child, however, if the *beeja* of a blind man possesses the abnormal factor for damaging eye sight, then the born child would be blind by *kakataliya nyaya*, otherwise no abnormality will occur. Similar hypothesis has also been expounded later, that due to abnormalities in dietetics etc. of woman, if her entire *beeja* becomes abnormal then she will not conceive, however, if a small portion is defective then the born child will have the abnormality of corresponding body part of maternal origin. Psychology of the woman also affects the fetus i.e. at the time of impregnation; to what she think about the, the child will have the same.^[23] *Sushruta* says that the fetus having shape of snake, scorpion or field pumpkin etc. are the results of sins or

bad deeds. Due to vitiation of *vayu* and insult or non-fulfillment of *dauhrida* (desires of pregnant mother) the fetus may become humpbacked, maim or crooked armed, lame, dumb and nasal voiced. The non-fulfillment of *dauhrida* results in birth of crooked legged, mentally handicapped, dwarf, defect in eye or its absence in child. The objects or desires of the lady neglected or not provided with any particular *indriya*, will result in abnormality of same *indriya* in the fetus. Thus in short atheism of parents, bad deeds of previous life (of the fetus) and aggravation of *vayu* are three causes of teratologic abnormalities. Development of body parts is a natural phenomenon, the qualities and normalcy in body parts are the results of righteousness and the abnormalities of unrighteousness. Bearing down efforts made by the woman in absence of labour pains are also said to produce deaf, dumb, hump backed child or the one with abnormally located body-parts.^[24] Acharya Bhela has enumerated *beeja-dosha* of mother and father, absence of use of beneficial (*pathya*) *rasas*, suppression of natural urges and *yoni dosha* (gynecological abnormalities) as causative factors for both infertility and teratologic abnormalities. The woman not using proper *rasas* during *ritukala* delivers abnormal child. The couple suffering from *udavarta*, consuming injurious diet gives birth to a weak and blind child. The vitiation of *vayu* and *akasha* and also curses of god result in birth of a child having abnormal shape like an elephant or dog etc.^[25,26]

DISCUSSION

A gene is that particular part of a chromosome which codes for a character. Genetic material in the nuclei of the cells present in 23 pairs of chromosomes is mainly responsible for typical or atypical pattern of inheritance. Autosomes are homologous 44 in number i.e., in a pair of 22. The last 23rd pair is alike only in female i.e. XX chromosomes in male. The 23rd pair consists of one X and smaller Y chromosome. Reduction division takes place in these germ cells having XX chromosome in female and XY chromosome in male giving rise to one representative of each pair. During the process of reduction division (meiosis) some exchange of genetic material also takes place between members of a pair. Hence the progeny have half set of chromosome from mother and half from father side.

Influence of psychological status of couple has been described at other places also i.e. whatsoever type of diet and mode of life is used by couple; the born child has similar character. Normalcy of psychology or happiness of couple is most important for conception. Coitus during menstruation and its hazardous effect described in classical text is supposed to be due to reduced normal defence mechanism (i.e. acid media of vaginal canal) during that period.

Coitus may result in either ectopic pregnancy or improper implantation or implantation failure due to improper motility of gametes. Chances of neural tube defects increase if the mother's age is fifteen years or less. Incidence of Down's syndrome increases with advancing age of mother. If first pregnancy occurs after thirty year onward slilge of woman are noted. Certain diseases of the woman i.e. hypothyroidism, diabetes mellitus, infections such as syphilis, rubella, cytomegalovirus, toxoplasma, herpes simplex are causative factors for congenital anomalies, abortions or IUDS. Tuberculosis can cause missed abortion. Drugs used specially during first trimester can cause teratogenicity in fetus. Physically or mentally ill woman can become infertile. Mentioned contraindications might have been given keeping these facts in mind. Classification of disease, gives a clear cut indication of hereditary disorder caused by chromosomal or monogenic or polygenic defects inherited from mother or father side or both. In the same way effect of maternal diet and habits had been quoted as responsible factors for various congenital anomalies.

CONCLUSION

Defects in ovum or sperms (gametes), deeds of previous birth, defect of uterine environment or uterine cavity, defect of time and duration, faulty diet and regimen of mother is found to be responsible for defects in size, shape, structure, colour and texture of progeny. It is nothing but effect of external environment over gametes and monogenic & polygenic basis of inheritance of disease in particular.

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