

EFFECT OF MATERNAL LIFESTYLE IN FUTURE ADULT- AN AYURVEDIC VIEW

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ABSTRACT

Ayurveda mentioned lots of regulation which are indicated in prenatal and post natal phases for getting good health of future adult but new world needs evidence or new outlook of earlier given concepts thus new scientific evidences are genuinely important to find out the applicability of older concept in context of new era. Now in this review we got many evidence based researches supporting the Ayurvedic concept but some concepts of Ayurveda are still untouched.

According to Ayurveda mothers are abided to follow *Garbhini paricharya* [antenatal care], *Ritukala paricharya* [Instructions during follicular phase] etc for getting good health of future adult, so the psychological or physical health of progeny is depend not only on lifestyle during antenatal period but also it depends lifestyle adopted since starting of mother's puberty. There are lots of sutras which define the unhealthy lifestyle effects progeny physically as well as mentally. We have classified maternal care according to the conception phase like before conception, during conception and after conception which are scattered in Ayurvedic text and found the related scientific research which are closely related with the subject along with that this review gives new applicable concept for further researches.

Keywords: Evidence base researches, Future adult, lifestyle during antenatal period

INTRODUCTION

The health of the fetus is determined by women's diet, exercise, lifestyle choice beside the chromosomal issues¹. A hypothesis postulating that the ground work for the 'fetal basis of adult disease [FEBAD]'' that organ undergo developmental programming

in utero predetermines subsequent physiologic and metabolic adaptation during adult life, prenatal insult such as nutritional deprivation or environmental exposure which disturb developmental programming could lead to a higher risk of diseases in adulthood². Research revealed more that the ma-

ternal lifestyle can jeopardize the baby's health. Mother healthy eating practices and lifestyle are suggested for getting healthy progeny³. In fact maternal micronutrients also determine offspring size and body composition⁴. Usually mothers have sufficient knowledge to adopt healthy lifestyle but mothers are not particularly concerned about it, as they perceive it as inevitable, Additionally the finding that women rarely follow advice from health professionals. Many women believed that pregnancy was time for rest. Some time women described cutting heavily on physical activity during pregnancy due to fear for the baby. Some time women perceived sedentary lifestyle during pregnancy, Studies revealed that pregnant women are inhabit to indulge with other unhealthy lifestyle like indulge to alcohol consumption⁵, Smoking⁶, sleep duration decreased⁷. Other environment factor like psychological stressed condition, maternal education, and maternal occupation also risks for children health⁸

Ayurveda also believes, maternal lifestyle very important factor for future adult health. According to Ayurveda mothers are abide to follow *garbhini paricharya* [antenatal care], *ritukala paricharya* [Instructions during follicular phase] etc for getting good progeny, so The psychological or physical health of progeny is depend not only on lifestyle during antenatal period but also it depends lifestyle adopted since starting of mother's puberty. There are lots of *sutras* which define the unhealthy lifestyle effects progeny. These are explained under following heading:-

Garbhadhan ayu [Conception age of parents]⁹

Garbhadhan kala [Day of conception]¹⁰

Ritukala charya [Life style during follicular phase]¹¹

Garbhadhan vidhi [Process of fertilization]¹²

Garbhoghhatkar bhav [Don'ts in Antenatal phase]¹³

Dohrid avmanna [Poor maternal care]¹⁴

Prasava paricharya [care during parturition]¹⁵

Acharya's quoted that if women will not follow the above indication, she will get physically or mantle compromised baby. Many advanced scientific evidence based trial also support the Ayurvedic concept of lifestyle. Although many concepts still not supported by researches. Here many researches based on maternal lifestyle and their effect on children are analyzed and compared with Ayurvedic view, these are following

- Everything the pregnant women feel and think is communicated through neuro hormones to her unborn child just as are alcohol and nicotine¹⁶.
- Many researches revealed that the anxious, stress and fearful state released the stress hormone these hormone cross through the placenta to the baby. The hundreds of studies have confirmed that chemical released by the pregnant mother's body are transported into the womb and affect the unborn baby¹⁷.
- Increased risk of childhood or adulthood obesity due to intrauterine exposure of maternal smoking¹⁸. Smoking effects the baby's hypothalamus and neuro behavior system¹⁹.
- Smoking during pregnancy causes intrauterine growth retardation²⁰.
- Childhood obesity is related to maternal lifestyle such as short sleep duration and skipped breakfast.²¹

- It has been reported that undernourishment during pregnancy increase risks of adult obesity in child²².
 - Under nutrition of mother causes intrauterine growth retardation and increase risk of abnormal glucose tolerance.²³
 - Low maternal Vit B 12 status is also associated with increased risk of neural tube defect and poor offspring cognitive function²⁴.
 - Important role for maternal one carbon metabolism in offspring growth and programming of noncommunicable disease risk. These ideas are supported by animal studies²⁵
 - Birth weight was reported to mainly affect by second half of pregnancy life-style.²⁶
 - Smoking during seventeen weeks pregnancy are related with childhood obesity²⁷.
 - Pregnant women suffering from stress are also more likely to have homosexual children of both genders because their raised level of stress hormone cortisol affects the production of fetal sex hormone²⁸.
 - Pre birth exposure to both nicotine and amphetamine increase the chance of lesbian daughter²⁹.
 - Poor nutrition can impair brain development of fetus.³⁰
 - Use of drugs in prenatal period can result in adult addiction use of marijuana can cause Attention deficit hyperactivity disorder³¹.
 - Heavy alcohol use can cause intellectual disability, heart problem, learning behavior problem³²
 - Both fetal and maternal genetic susceptibility affect the intrauterine during the first 8 weeks of pregnancy, when primitive heart is forming and developing. Three folate related functional polymorphism combined with maternal periconceptual obesity, smoking, alcohol intake and folate supplement use on the risk of Congestive heart diseases [CHD]. Maternal genotype was not independently associated with CHD risks for any functional polymorphisms^{33,34}, but finding indicate that periconceptual maternal obesity, smoking and alcohol use combined with functional polymorphisms may increase the risk of CHD.³⁵
 - New research by the universities of Exeter and oxford provides the first evidence that a child's sex is associated with the mother's diet. The study shows a clear link between higher energy intake around the time of conception and the birth of sons³⁶
 - Prenatal exposure to diverse environmental chemical dysregulates the fetal epigenome, with potential consequence for subsequent developmental disorders and disease manifesting in childhood. Windows of potential vulnerability to epigenetic dysregulation are represented by three dynamic stage first Fo [primordial germ cells of each of parents], F1 [The embryonic period of offspring maintain methylation in somatic cell], F2 [developmental germ cell]³⁷
- The above study shows the relation between maternal lifestyle and its effect on progeny.

SCIENTIFIC EXPLANATION OF AYURVEDIC CONCEPTS

Before studying the risk factors we should know about the deferent vulnerable periods for developmental defect. These periods are divided according to conception. These stages are also vulnerable to epigenetic dysregulation.

1. **Before conception** – this phase is related with the development of male and female gamete. These are also known as F0 stage. Ages of parents are significant factor to develop either health or unhealthy progeny. This period also associated with *Ritukala paricharya* which significantly determine the future of progeny.
2. **At the time of conception** – This phase is associated with contact of sperm and ovum. The time of conception is associated significantly with fertilization and formation of embryo [F₁ phase], determine sex, chromosomal defect and survival of progeny etc.
3. **After conception** – This phase again divided in two phase
 - a. During pregnancy – *Garbhopghatkar bhav* and *Dohridavmanna* can be studied under this topic, The connection between mother and fetus is umbilical cord which regularize the development of different organs [like genital organ F₂ phase].
 - b. After pregnancy – Post natal care is major determinative factor for adult well being.

❖ **Before Conception**

Garbhadhan ayu [Age of conception]:- *Acharya charka* quoted that the ideal age of conception for mother is 16 yrs onwards and for father is 25 yrs onwards. If mother age is under 16 yr either fetus may not survive or born unhealthy [*durbala indriya*]. If the

mother is too old than new born will prone to have many diseases.

Studies show teenage pregnancy in human female under the age of 20. Longitudinal studies of the offspring of teenage mothers suggest that their offspring are at risk for many negative outcome across the lifespan , even after controlling for the effect of lower socioeconomic status³⁸. Earlier [Ayurveda era] the health of mother can tolerate the pressure of pregnancy at the age of 16. Studies revealed that older women are more likely to have pre existing medical disorder such as diabetes mellitus or hypertension³⁹. Pancreatic B cell function and insulin sensitivity fall with elder age. Women with the predisposition to type 2 diabetes are therefore more likely to have an inadequate B cell response to stimulate and be more insulin resistance than younger women, which when combined, make gestational diabetes more likely⁴⁰

Older women delivering a small for gestational age baby may be related to poorer placental perfusion or Trans placental flux of nutrients⁴¹. Increased flux of nutrients across could cause fetal hyperinsulemia and accelerated fetal growth⁴².

Several studies showed an association of high risk for breast cancer with advanced maternal age at reproduction⁴³. Advanced maternal age at child birth was observed among first born men with testicular cancer⁴⁴. Several studies have investigated advanced parental age as a risk factor for Alzheimer disease and mental disorder⁴⁵

Ritukala Paricharya⁴⁶ [lifestyle during follicular phase]

Acharya sushrut expalained some daily activities which should follow from the

first day of *ritukala* [Follicular phase] negligence of these activities would have harmful

for her progeny. The following table shows activities and their effect on progeny.

Activities of women	Effect on Progeny
Day Sleep	Somnolent
Apply collyrium	Blind
Weeping	Disease in eyes
Repeated bath and application of lepa	Sorrow full
Massage with oil	Handicapped
Cutting the nails	Defected nail
Running	Hyperactive
Laughing	Lips teeth, tongue, palate become black
Talkativeness	Talkative
Hearing loudness	Deaf
Hair setting	Baldness
Contact to air/ hard working	Delirium

The purpose of these activities to provide an environment that ensures delivery of developmentally competent oocyte and capacitation sperm to the site of fertilization. These activities help to select the follicle for ovulation must be at the right place at the right time.

Not any Studies revealed correlation between follicular phase activities and psychological problems but one of the study determine whether maternal exposure to pubertal abuse is associated with risk for emotional symptoms in offspring .correlation between puberty phase emotional stress are more likely to have children with autism⁴⁷.

Globally women and girls have developed their own personal strategies to manage the menstruation. These vary from country to country and within countries, dependent on an individual preferences, available resources, economic status, local tradition and cultural believes and knowledge or education.⁴⁸

These all activities are considered as restriction due to lack of knowledge about menstrual education. Now Government plan to give menstrual education at school or at home, for encouraging good menstrual practices⁴⁹. Study suggested that follicular phase compromises Indies of power performance in fairly active women ages 18-25 year⁵⁰

❖ At the time of conception

***Garbhadhan Kala* [Time of Conception]**

Acharya Sushrut explained that conception day is also important factor to develop illness or good health of progeny. If conception is carried out on first day the baby can not survive. On second day and third day baby may die within 10 days but fourth day conception may results long life of baby and physically developed child will born. Conception on paired days result predominance of male birth and conception on unpaired days result predominance of female birth⁵¹

Some studies revealed that they did not find evidence to support the hypothesis that pregnancies probably conceived around the time of ovulation result in a predominance of female births⁵².

Time of conception, depends upon timing and frequency of intercourse in fertile window, fertile window made up according to menstrual cycle. Fertile phase is determined by maximum life span of sperm and egg. Sperm can survive a maximum of five days in fertile cervical fluid and ovum can survive for up to one day. Theoretical fertile window is thus six days long comprised of the five days before ovulation and the day of ovulation maximum chance of successful conception when intercourse on any of these six days. In recent analysis of 119,398 cycles from women try to conceive. It was found that 94% of women who became pregnant had intercourse on at least one of these three days, for conception purpose, it is thus ideal to have intercourse during three day fertile windows which include ovulation day and the two previous days⁵³.

According to Ayurveda fertile period is starts from 4 th day to onwards because the mouth of cervix is opened, It will closed after completion of menstruation. Several studies show that life spans of sperm extend from 24 hrs to 6.1 days. So it can be concluded that once sperm enter to womb it will survive from 24 hours to approximately 7 days and achieve the fertilization.

❖ **After Conception Garbhadhan Vidhi [Process Of Fertilization]**

Acharya Sushruta explained the process of fertilization. Fertilization takes place with help of four things Matured ovulation and proper menstruation. Healthy

uterus, Healthy nutrition of mother, Healthy sperm.

The planned pregnancy results an adult, who will be beautiful, strong, long lived, rich and capable enough to take care of their parents⁵⁴.

The mother play main role for getting healthy child. Three out of four factors are associated with only female. Here *acharya* gives the term *vidhipurvaka* which can be known as planned or intended pregnancy. As we know that family planning is one of the 10 great public health achievement of the 20th century where goal of family planning is to improve pregnancy planning and prevent unintended pregnancy⁵⁵. Although studies revealed that they did not observed any increased risk of adverse pregnancy outcomes among women who experienced an unplanned pregnancy while using natural family planning⁵⁶

Garbhoghatakar Bhav [Donts in Antenatal care]

Garbhoghatakar bhav the activities which are prohibited for mother during antenatal period. These activities can cause the diseases in progeny. Mother are in habit to take sleep in *Pratato uttanshayini avastha* or in supine position the baby pressurise the vena cava due to more gravitational force, These results reduce venous return to the heart. Decreased cardiac output activate the aortic and carotid sinus baroreceptor reflex cause the fetal hypoxia. Some psychological stressed condition like *kalikalah shila* [habit to Quarreling], *shoknitya* [depressive illness], *Amarshini* etc caused the mental disease in progeny. Some defective dietary habits like excessive intake of fish, frog flesh, pig flesh, buffalo, and cow flesh caused disease in different organs like CNS,

genito urinary system etc. Excessive intake of sweets causing obesity, Diabetes. Excessive intake of acidic food causing skin and eye diseases, salty food causing baldness and whitishness of hair. These factors are somehow related with the epigenetic mechanism and influencing the new progeny.

Dohrid avamanana [Satisfaction of Mother After first trimester]

After first trimester the fetoplacental circulation is established so the fetus gets its nutrition from mother. Mother adopted unhealthy lifestyle like Unhealthy nutrition, psychological stress, sleep pattern, occupation, other desires may effect fetal growth.

Acharya sushruta describes some desires of mother in antenatal period which effects behavior of future adult. *Acharya* mentioned that these desires must be fulfilled because if mother is unsatisfied that will harm the fetus due to excessive secretion of cortisol in maternal stress condition.

If mother desire is pleasant and healthy than it must be fulfilled because the pleasant diet, environment gives stimulation for the mental and physical growth of progeny. The desires can be divided in three categories

- 1- Desire of specific food like goat, buffalo, pig etc flesh
- 2- Desire for specific environment like monastery, temples where statue of god present, fort where king can be seen, Forest where violent animals found
- 3- Desire for wearing ornaments

There are lots of studies which are somehow related with the Ayurvedic concept. Many of evidences, including epidemiologic data and data from extensive clinical and experimental studies, indicate that early life events play a powerful role in influencing

development of baby and later susceptibility to certain chronic diseases. The developmental plasticity requires stable modulation of gene expression and this appear to be mediated, at least in part by epigenetic process such as DNA methylation and histone modification. Thus both the genome and the epigenome interactively influence the mature phenotype in utero life and determine sensitivity to later and subsequent risk of disease⁵⁷.

One of the study shows slow growth in utero may be associated with increased allocation of nutrients to adipose tissue during development and may than result in accelerated weight gain during childhood. which may contribute to a relatively greater risk of coronary heart diseases, hypertension and Type 2 diabetes mellitus.

Role of Epigenetics

Researches focused the correlation between early development of fetus and manifestation of disease in term of epigenetics, Epigenetics is the study of heritable changes in gene expression or phenotype occurring without changes in DNA sequence⁵⁸. The prenatal period is highly susceptible to epigenomic deregulation with implication for health lifelong and Trans generationally. The role of prenatally acquired somatic epigenetic alteration disease has been quite widely studied. The early emotional environment can lead to long lasting epigenetic changes in the brain. One of the first examples of this came from animal studies of maternal care. Rats pups who were licked and groomed a lot by their mother showed reduced anxiety and lower stress responses in adulthood. These effects were due to epigenetic changes within the brain of the offspring specifically at the receptor for the

stress hormone cortisol⁵⁹. The epigenetic deregulation are represented by three dynamic stages these are

1. beginning with F₀ the primordial germ cell of each of the parents, through gametogenesis,
2. after fertilization, the embryonic period of offspring [F₁],
3. Followed by the methylation in somatic cells and the development of germ cells that will become F₂.

Factors like alcohol consumption, smoking stress etc affect to F₁ generation and subsequently to F₂ generation. Environmental epigenome reflects the constant interplay between the environment, which includes both endogenous [such as hormone levels or immune status] and exogenous factor [such as nutritional and chemical exposure] and the epigenome.

It is very difficult to overemphasize of prenatal environment to a developing fetus. Indeed a pregnant mother's health, diet and level of exposure to toxins and environmental all have direct effect on fetal development. Environmental toxin that might harm a fetus are taken voluntarily, such as drugs, alcohol and cigarettes these all has been linked to an increased risk of stillbirths, low birth weights, cleft lip⁶⁰

Prasava Paricharya [effect of parturition especially second stage of labor]

Acharya sushruta explained the effect of second stage labour on future child, he explained that bearing down efforts are only applied on the presence of contraction without contraction these efforts can harm the baby, This will cause deafness, dumbness, handicapped trauma on head of baby, cough, breathlessness, weight loss, and abnormal physical appearance of the baby.

Study revealed that mode of birth may have a strong association with women's psychological and physical outcome in first few months after delivery. Women's symptoms were highest at 10 days in postnatal period. A survey based study done on 5332 women. The women included according to mode of birth. Most women [n=3275 61%] had unassisted vaginal birth. Vantouse-assisted vaginal birth and forceps assisted vaginal births and were reported less frequently by 6% [n=302] and 7% [n=359] of women, respectively. A total of 12% [n=630] of women had a planned caesarian and for 13% [n=675] their caesarian was unplanned. The most common physical symptoms reported at 10 days after birth were fatigue or severe tiredness [37%], breastfeeding problems [35%], painful stitches [34%] and backache [28%]. The psychological symptoms like depression [11%], anxiety[17%] and PTSD- type symptoms [1 symptom 24%, 2-3% symptoms 9%] at 1 months after birth observed in case of forceps assisted vaginal birth and unplanned cesarean section reported the poorest psychological well being after birth also. While those women who had unassisted vaginal births and planned caesarian section births were less affected by the birth process. On result suggest that both psychological and physical domain need to be assessed in terms of understanding the factors influencing the duration and severity of problems affecting women's postnatal health and well being⁶¹ because it can be causative factor for developing the emotional imbalance in adult behavior. Premature delivery independent of size for gestational age, has been associated with insulin resistance and glucose intolerance in pre pubertal children

that may track into young adulthood and may be accompanied by elevated blood pressure.

According to modern parlance the bearing down efforts without contraction cause the hypoxia in baby, acidosis and fetal distress conditions

CONCLUSION

Maternal life style with good diet and healthy lifestyle do not ensure a healthy child, although they do play protective role. There is need to follow the Ayurvedic way of prenatal and postnatal care with merging the valid modern researches. This review provides new concepts for monitoring the pregnant women or women want to get pregnant. Lots of questions arise to ask with women before pregnancy or after pregnancy. These questioners will help not only to prevent chronic diseases in mother and child

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but also it help to provide distress reliving counseling. Ayurvedic health professional should follow the revalidation of Ayurvedic way of planned pregnancy. There is need of clinical trials to know the outcome of Ayurvedic *garbhini paricharya* and find out any negative effects of maternal stress and unhealthy lifestyle. The standardization of the *garbhini paricharya* and Ayurvedic method of planned pregnancy are needed to optimizing the pregnancy outcome.

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