



Asian Journal of Modern and Ayurvedic Medical Science | ISSN 2279-0772

[ONLINE]

Volume: volume1,number 1 | publication Date: Sunday, July 01, 2012

Published by Mpasvo [article url

<http://www.ajmams.com/viewpaper.aspx?pcode=92c390cb-03f3-4db8-910c-1fa136ae1f18>

**Published paper's title : How
mother's life style influence on
fetus**

Authors : Sangeeta Gehlot¹, , B M Sing² and Sushma Tiwari³ ,¹Associate Professor & Head, Deptt. Of Kriya Sharir, Faculty of Ayurveda, IMS, BHU ,Varansi,up,India ,²Associate Professor & Head, Deptt. Of Kaumarbhritya/Balroga Faculty of Ayurveda, IMS, BHU, Varansi,up,India, ³Senior Resident ,Deptt Of Kriya Sharir, Faculty of Ayurveda, IMS, BHU.,

Research Paper

HOW MOTHER'S LIFE STYLE INFLUENCE ON FETUS

Sangeeta Gehlot¹, B M Singh² and Sushma Tiwari³

Declaration

The Declaration of the authors for publication of Research Paper in Asian Journal of Modern and Ayurvedic Medical Science (ISSN 2279-0772) We Sangeeta Gehlot¹, B M Singh² and Sushma Tiwari³ the authors of the research paper entitled How mother's life style influence on fetus declare that , We take the responsibility of the content and material of our paper as We ourself have written it and also have read the manuscript of our paper carefully. Also, We hereby give our consent to publish our paper in ajmams , This research paper is our original work and no part of it or it's similar version is published or has been sent for publication anywhere else.We authorise the Editorial Board of the Journal to modify and edit the manuscript. We also give our consent to the publisher of ajmams to own the copyright of our research paper.

Received january 3,2012;accepted june 25, 2012 ,published july1,2012

ABSTRACT Basic philosophy of Ayurveda is 'Svasthanya Svasthya rakshanam' i.e. protection of health of an healthy, the treatment of ailing i.e. 'Aturasya vikaraprashamanam' is the second step. With this philosophy in mind, mode of life and dietetics prescribed for entire reproductive life are aimed at having normal healthy child capable of active, productive, healthy and long life a healthy mother and to prevent birth of child either abnormal or susceptible to suffer at a later life.

INTRODUCTION

Creation is utmost essential for the continuity of generation and happiness. Fetus is completely dependent on the mother for nutrition, growth & development. Health Status of Fetus reflects mother's life style. Life style includes nutrition, physical fitness, hygiene, sleep, stress management, cultural and personal choice, and social adjustment. Life style is the way a person lives. Lifestyle diseases include atherosclerosis, heart disease, and stroke; obesity, Type 2

diabetes, alzheimer's disease, asthma, cancer, chronic liver disease or cirrhosis, chronic obstructive pulmonary disease and diseases associated with smoking, alcohol and drug abuse .First 12 weeks after conception are critical period for the fetus. The period of greatest sensitivity for the developing fetus is between 2-8 weeks after conception. During which fetus cells organize differentiate and vital organs being to form. Normal and abnormal development of any body parts depends upon the mother's diet, habits, exposure to external environment and other activities



adopted by the mother during the pregnancy. Ritu (ritukala), Kshetra(female reproductive system) Ambu (water, nourishing substances) Beeja (ovum and sperm) are the essential factors which play the important role for new creation. (Su. Su. 15/8)

MODE OF LIFE DURING MENSTRUATION

In Ayurveda specific mode of life, i.e. stay in a peaceful a bit segregated place away from stress, strains of daily routine of life light and digestible food is advised. Certain acts are contraindicated, which if not followed can cause various physical/psychological disorders in the child likely to conceive in that cycle. Segregated living and mode of life prevents contact with persons likely to infect her and also from psychological stress, strain. During menstrual cycle itself the follicles are maturing, some genetic imprinting may influence the outcome of fetus conceived in that cycle.

METHOD OF CONJUGATION

After proper cleansing of the body through oblation, sudation, emesis, purgation, cleansing and nutritive enemas, then having attained normalcy, the man having received the diet of ghrita, milk cooked with drugs of madhura group and the female having eaten sesamum oil, black gram etc. should have coitus. Before coition specific procedure i.e. putreshtiyajna is advised to be performed in which the woman specifically is advised special diet, mode of life, apparels etc. as per desire about the behavior of every one with the woman has to be pleasant and congenial. Smoke emanating from oblation fire cleanses the environment, specific diet gives her adequate nourishment so that she is protected from

environmental pollutants and complication of under nourishment during preconception period naturally she is able to give birth to a healthy child. Sex should be done only fourth day onwards of menstruation. The child conceived on third day of menstrual bleeding period is likely to be short lived(Su.Sh2/31) Physically and psychologically healthy couples at appropriate age i.e. neither too young nor too old only should try to have child. Non observance of these rules is likely to invite various complications. The ovum getting fertilized on third day would have been maturing from earlier cycle and follicle ruptured not in a normal hormonal milieu, thus due to some genetic imprinting or predisposition the child may suffer from certain diseases at a later age. Nutritional status of chronically ill and hungry, thirsty, woman will not be normal and other grief etc. conditions may influence HPOA, thus influence fertilization or growth and development of fetus and make the fetus susceptible for disease at later life. During the first trimester of pregnancy the embryo increases in size by more than 2.5 million times. Because of this rapid development, the fetus is especially vulnerable to injurious stimuli. Almost all known abnormalities of the fetus are developed at this time. Normal and abnormal development of any body parts is dependent on the mother's diet, habits, exposure to external environment and other activities adopted by the mother during the pregnancy. By the time women reach 35 years of age, the incidence of genetic abnormalities and spontaneous abortion increase observably with maternal age (Nasseri and Grifo, 1998).

DIET

The pregnant women should take congenial diet with due consideration



of quality, quantity, digestive capacity, place of living etc. Specific diet for different months of pregnancy depending upon the requirement has been described. In first three months cold, sweet milk, liquid diet repeatedly in appropriate quantity should be given, especially in third month cooked sali rice with milk, milk added with honey and ghee. In fourth and fifth month milk, butter, cooked rice, curd, meat-soup of wild animals, congenial palatable food should be offered. In sixth month ghee extracted from milk cooked with sweet drugs, rice gruel with ghee cooked with svadamstra(Gokshur) should be given whereas in seventh month all above mentioned diet, ghee cooked with prthakparnyadi group should be taken. Rice gruel with milk added with ghee should be given at eight month(Ch.Sh.8/32, Su. Sh.10/3, As.Sh.3/3-11, As. Hri.1/64-65) .In first trimester of pregnancy women feel nausea and vomiting, Indication of cold, sweet, liquid diet and milk prevent dehydration and provide required nourishment. Use of madhur group drugs due to its anabolic effect help in maintenance of proper health of mother and fetus. From the fourth month onwards growth or muscular tissue requires protein which can be obtained by the use of meat soup. Use of Gokshur (diuretic) in the sixth month prevents water retention and its complication on fetus. The pregnant mother is advised to have balanced diet and not to use diet likely to aggravate doshas, because intake of vata aggravating diet may produce idiot, deaf, dumb, nasal or hoarse voice, humpbacked, dwarf, less or more body parts child whereas intake of Pitta aggravating diet may produce baldness, graying of hair, absence of moustache, beard etc. and yellowish discoloration of skin, nail and hair in child. Use of kapha aggravating substances may

cause skin disorders including leprosy, vitiligo, birth with teeth Long list of Factors likely to injure the fetus (garbhopaghatakara bhavas) related to mode of life and dietetics and their effect on fetus/child have been described in the classics.(As.Sam.Sh2/54-56, As.Hri.Sh.1/48) Charaka has described the complications caused by excessive use of rasa in pregnancy like Amla rasa (sour) substances may cause bleeding diathesis, eye disorder . Excessive use of bitter (katu) articles may cause weak, possess less quantity of shukra (semen) and infertility. While describing dietetics and mode of life to be avoided, Charaka has mentioned that excessive use of heavy hot, pungent diet, hard activity, mad-karaka diet, meat substances are injurious to sense organs.(Ch. Sh. 4/18) Excessive use of sweet substance except milk may cause Prameha and obesity in fetus. Intake of uncooked soft cheese, unpasteurized milk and its products, uncooked meat and fish contain listeria bacteria. During pregnancy listeriosis can cause miscarriage, preterm labor or still birth. The mothers who are in continuous contact with infected pet animals like cat may suffer from toxoplasmosis may induce macro or microcephaly, microphthalmia in fetus. Use of seafood containing mercury and other toxin causes miscarriage, preterm labor or still birth, risk for developmental delay. High consumption of Marijuana is associated with poor fetal growth and development, abnormal neurological behavior in newborns. A high level of caffeine consumption during pregnancy has also been associated with an increased risk of stillbirth (Wisborg et al., 2003).

EFFECT OF FASTING



A new research published online in the FASEB Journal study shows that what mother ate during pregnancy may make kid obese or overweight by altering the function of genes (epigenetic changes) that regulate circadian rhythm. Pregnant primate females consuming a high-fat diet altered the function of fetal genes that regulate circadian rhythm (including appetite and food intake) during development. The offspring also had non-alcoholic fatty liver disease. The research demonstrated that the offspring of mothers who overeat are at risk for liver and pancreas damage. Both of which can contribute to early-onset obesity and diabetes. Significant brain changes can occur in the offspring of some mothers who overeat. These changes take place in the hypothalamus. (ScienceDaily, Nov. 23, 2010) Mother's fasting by 50% food restriction during pregnancy has been shown to reduce fetal size significantly (J. Nutr. 113: 1823-1832, 1981)

VITAMIN D SUPPLEMENTS IN PREGNANT WOMEN:

Low maternal vitamin D levels during pregnancy have been linked to various health outcomes in the offspring, ranging from periconceptional effects to diseases of adult onset. Maternal and infant cord 25(OH) D levels are highly correlated. (Ponsonby AL et. al 2010) Furthermore, experimental data also anticipate that vitamin D sufficiency is critical for fetal development, especially for fetal brain development and immunological functions. Vitamin D deficiency during pregnancy may, therefore, not only impair maternal skeletal preservation and fetal skeletal formation but also be vital to the fetal "imprinting" that may affect chronic disease susceptibility soon after birth as well as later in life.

In assessment of effects on calcium status and fetal growth mothers in the treatment group gained weight faster in the last trimester than those in the control group, and at term they and their infants all had adequate plasma 25-OHD concentrations. Mothers and infants in the control group, however, had low plasma concentrations of 25-OHD and calcium and raised plasma alkaline phosphatase (bone isoenzyme) activity. Infants developed symptomatic hypocalcaemia. , many infants in the control group were SGA (29% v 15%), Infants in the control group had larger fontanelles, impaired ossification of the skull. (Prevention of Rickets and Vitamin D Deficiency in Infants, Children, and Adolescents Pediatrics 2008; 122:1142-1152)

DAUHRIDRA

The woman's specific desires particularly during second to fourth month are called dauhridra as she has two hearts i.e. one her own and other of the child. The desires some of them neither experienced before pregnancy nor later are called dauhridra, which indicate the future nature/qualities of the child. It is stressed that these desires must be fulfilled, if not, the child may suffer from certain congenital disorders. Fulfillment of Dauhridra desire results in optimum development of qualities and longevity in fetus. Dauhridra gives birth to a Rupvan Shoor (valiant), Pandita and Sheelvan child (*H.S.-3rd Sthan* 49/10) Either mother or fetus may be affected because of non-fulfillment of desire of Dauhridra. Vitiating vata/vata-vitiating substances, due to suppression of desire, move in the fetus and may induce various disorders abnormalities or even death (Su. Sh.3/14) Dauhridra avmanana may produce Kubja (Meningomyelocele), Kuni (abnormal



upper extremities), Khanja (abnormal lower extremities), Vaman (dwarf), Jada (retarded activities of fetus) and abnormal eyes or absence of eyes (Su.Sh.3/15)

EXERCISE AND POSTURE

During early pregnancy heavy exercise should be avoided because increased body temperature has been implicated in neural tube defect. Exercise performed to breathless reduces the amount of oxygen being carried to the fetus. Moderate and mild exercises help to maintain muscle tone for back and pelvic muscles. Sitting in abnormal position, suppression of urges of defecation, urination, use of less quantity of food, trauma may cause intra uterine death of fetus, premature delivery, abortion or fetus becomes dry (upasukka) or weak (IUGR thus LBW). (Ch.Sh. 8/21)

SLEEP

The best sleeping position for pregnant women are left lateral position because it improves uteroplacental flow to the fetus and reduce the swelling and improves kidney function. Avoid lying on back (supine) because of pressure on the inferior vena cava as well as on the back and intestine. Avoid sleeping in prone position because of pressure on fetus. If mothers takes excessive sleep fetus will be having decreased digestive capacity and sleepy ignorant. (Ch. Sh. 8/21) Loss of sleep may increase the frequency of convulsion in mother which may adversely affect the fetus. During first trimester increased sleep is caused by increasing level of progesterone while in last trimester poor sleep quality is due to leg cramps, backache, heartburn, movement of fetus and increased frequency of urination. Disturbed

sleep can cause postpartum depression.

STRESS

Stress cause the release of hormones that reduces blood to the placenta and triggers contractions which may cause miscarriage, preterm birth and low birth weight fetus. Psychological and physical strains like grief, shock, anger, excessive exercise, carrying heavy weight, vehicle riding may cause abortion, intra uterine death of fetus. Stress causes the release of hormones that reduced blood to the placenta and triggers contractions which may cause miscarriage, preterm birth and low birth weight fetus. Stress hormones activated by maternal anxiety may have a long-term effect on the child's brain development and future behaviour. Infants born to women of the high/increasing depression group had significant ACTH elevation at birth. On NNNS examination, these infants were more hypotonic and habituated to auditory and visual stimuli at birth. (Sheila Marcus et. al. 2011)

DRINKING

If mother drinks wine daily borne child will be over thirsty, short memory and fickle mind. (C. Sh. 8/21). Fetal alcohol syndrome results from excessive use of alcohol. The consumption of alcohol has also been shown to have adverse effects on pregnancy outcome and the most vulnerable time for the unborn child is the first few weeks after conception (Day et al., 1989; Collier et al., 2002)

SMOKING

Prenatal tobacco exposure has been reported to be a significant risk factor for sudden infant death



syndrome (SIDS) (National Cancer Institute [NCI] 1999) Maternal smoking during pregnancy has long been considered an important risk factor for LBW. Birth weight decreases in direct proportion to the number of cigarettes smoked (Persson et al. 1978; Yerushalmy 1971), and children of smokers are 150 to 250 grams lighter than are the children of nonsmokers (USDHHS 1980). Prenatal tobacco exposure has also been linked to CNS effects, including cognitive and neurobehavioral outcomes. At birth, prenatal tobacco exposure has been associated with poorer auditory orientation and autonomic regulation (Picone et al. 1982) and increased tremors and startles (Fried and Makin 1987) Smoking may cause cardiac abnormalities, anencephaly, cleft lip and cleft palate and increases the incidence of respiratory disorder like bronchitis, pneumonia during first year of life. Alcohol is a known teratogen (Randall, 1987; Chaudhuri, 2000) Actual birth weight declines steadily as the number of cigarettes smoked increases, implying a cumulative effect of smoking on the fetus. Affects prenatal and postnatal growth, increases the risks of fetal mortality, morbidity, and cognitive development.

DRUGS AND DISEASES

Drugs given to mother for her illness may be adversely affect the fetus. Gestational hypertension is a major cause of prematurity, IUGR and fetal hypoxia. Use of ACE inhibitors may cause congenital anomalies. UTI during pregnancy may be associated with prematurity and LBW. Maternal systemic lupus erythematosus may lead to fetal death, IUGR and transient neonatal lupus erythematosus. The incidence of congenital malformation is more in offspring of diabetic women. Oral

hypoglycemic drugs during pregnancy may cause teratogenesis and intractable hypoglycemia in newborn baby. Deficient iodine intake during pregnancy in endemic areas may be associated with hypothyroidism at birth. Vitamin A overdose has been associated with kidney malformation, neural tube defects and hydrocephalus whereas vitamin D overdose with cardiac neurologic and renal defects. Corticosteroid therapy during pregnancy may cause fetal death, IUGR and premature labor. Maternal hypercalcemia may cause suppression of fetal parathyroid glands and after birth baby may manifest hypocalcemic fits. High doses of antithyroid drugs during later pregnancy may cause fetal goiter and hypothyroidism. Epileptic mother on anticonvulsant therapy have greater risk of CHD, cleft lip and cleft palate.

Tetracyclines cross the placenta and are concentrated and deposited in fetal bones and teeth, giving a yellowish discoloration of the teeth. Aminoglycosides (streptomycin, gentamicin, etc.) can damage the fetal inner ear. The

chloramphenicol can cause respiratory collapse of the newborn ("gray baby syndrome"). Sulphonamides given near delivery can cause jaundice. DES is used to prevent these miscarriages; it increases production of certain hormones created by the placenta. A female fetus exposed to DES is at risk for developing vaginal and cervical cancer as well as uterine defects. A male fetus exposed to DES is at risk of developing abnormal genital. (Singh M, 2010)

Opioid exposure has consistently shown a decrease in nucleic acid synthesis and protein production in the brain, suggesting overall brain



growth is compromised. Increase the rate of premature labor, premature rupture of membranes, breech presentation, APH, toxemia, anemia, uterine irritability and infection. The child will lack spatial awareness, orientation, directionality, and left-right discrimination. Cocaine causes cardiovascular effects including acute myocardial infarction, cardiac arrhythmia, rupture of the ascending aorta, central nervous system complications. Less frequent effects respiratory arrest, seizures, Nutritional deficits and weight loss. Crosses the placental barrier and causes lower gestational age at delivery, LBW, IUD, decreased body length, smaller head circumference. Fetal anomalies, skull malformations, limb defects, urethral obstruction, enlarged bladder, cystic distension of the kidneys, and neural defects. Increased risk of SIDS, apnea and deep sleep phenytoin an exposed fetus has increased risk for developing a cleft palate, developing heart defects, having small heads, abnormalities in the fingers and nails, and some mild developmental disabilities. The combination of defects is called "Fetal Hydantoin Syndrome". Folic acid deficient diet in pregnancy causes neural tube defect in fetus. Lithium during pregnancy is associated with increased risk of fetal cardiovascular malformations. Use of streptomycin causes deafness while tetracycline can create dental discoloration. Mega doses of vitamin A and D have been associated with abnormal fetal development, heart and facial defects. Babies born to diabetic women are at an increased risk of certain congenital malformation. In epileptic mother babies exposed to anticonvulsant medication used to treat epilepsy may be born with birth defects and vitamin K deficiency. Use of corticosteroid by mother may cause cleft lip and palate, growth retardation. If mother uses narcotics

fetus may suffer CNS depression. Excess of thyroid hormone during pregnancy has a direct toxic effect on the fetus, tripling the risk of miscarriage and reducing the average birth weight of infants who survive. Thyroid hormone deficiencies in early pregnancy can cause locomotors underdevelopment in the child, Impaired thyroid function in mother and fetus has been associated with smoking during pregnancy. Excess of thyroid hormone during pregnancy has a direct toxic effect on the fetus, tripling the risk of miscarriage and reducing the average birth weight of infants who survive. Thyroid hormone deficiencies in early pregnancy can cause locomotors underdevelopment in the child, Certain drugs have been prescribed as garbhashapana i.e drugs which after counteracting the effect of harmful factor for fetus help in its proper maintenance like aindri, brahmi, shatveerya, doorva, amogha, shiva, arishta, vatyapushpi, vishvaksenkanta (As.San.Su152/48, Ch.Sh.9/48-49, Ka.Sam.Khi.10)

Cocaine use in a pregnant woman may lead to abruption placenta, fetal tachycardia, CNS irritability and cerebral infarcts. LSD has been shown to cause chromosomal damage leading to stunted fetal growth. (Zuckerman, B 1989) . Intake of marijuana during pregnancy may be associated with thymic hypoplasia results in increased incidence of respiratory infections and diarrhea. (Singh M, 2010)

MUSIC AND PREGNANCY

Music may reduce the stress , anxiety and depression that many pregnant women experience. A study published in the *Journal of Clinical Nursing* shows that the participants who listened to music for 30 minutes



per day for two weeks significantly reduced their stress, anxiety, and depression, compared with participants who did not. Exposure to music in the prenatal period seems to be linked to increased attention, more sound imitation and earlier vocalization in the baby. Many studies that suggest the mother's voice is the preferred sound of newborns, who appear to recognize their mother's voice at birth. Stimulation of the brain with music would have a positive effect. It is when the baby is growing in the mother's body that the majority of brain development occurs. Soothing, classical music and nature sounds are believed to be soothing, while louder types of music may startle the baby.

POLLUTION

Exposure of mother to X-ray in first trimester of pregnancy may cause microcephaly, mental retardation and skeletal malformation. Heavy exposure of aerosols, oven cleaner and paint fumes has been linked to birth defects. In pregnant mothers lead exposure has been associated with miscarriage, preterm labor, low birth weight, mental and behavior problems in children. Exposure to air pollution significantly reduces fetus size during pregnancy, Water pollution causes delayed or incomplete mental development, abortions and birth of deformed children, autism or brain damage of growing fetus in pregnant women. Prenatal and infant mercury exposure can cause mental retardation, cerebral palsy, deafness and blindness. Drinking water contaminated with nitrates restricts the amount of oxygen that reaches the brain and causes a dangerous disease called 'blue baby' syndrome Exposure to excessive noise during pregnancy(≥ 80 dB) may results high frequency hearing

loss in newborn and may be associated with prematurity and IUGR. Air pollution can impair lung function in the womb. (Barker DJ 2007)

For the growth and development of fetus mother should take adequate quantity of milk, liquids, dairy products, egg, nuts, beans, green leafy vegetables, fruits, whole grains otherwise borne fetus will be IUGR or malnourished. Avoid life style behaviors that are harmful to the fetus. Ideal life style like proper sleep, nutritional diet, stress-pollution free environment, no smoking and drinking, proper sitting & lying position and light exercise should be followed for the well being of mother as well as fetus. (Ferran Ballester et.al 2011 Richards M 2002)

REFERENCES

*Astanga Samgraha (Part I) Hindi commentary by Atrideva Gupta, Nirnaya Sagar Press, Bombay 1951.

*Astanga Hridaya: Hindi commentary by Lal Chandra Vaidya Motilal Benarasidas, Varanasi, 1st edition .1963.

*Ayurvediya Prasuti Tantra Evam Stree Roga 1st Part by PV Tiwari, Chaukhambha Orientalia Post Box No.1032 Varanasi

*Charak Samhita edited by Vaidya Jadavaji, Trikamji Acharya, Chaukhambha Surbharati Prakashan, Varanasi reprint edition, 1992.

*Harita Samhita : Hindi commen. By Ravidatta Shastri Gangavishnu Ganapatakrishna ji Press Bombay. 1st edition, 1893.



*Kashyapa Samhita: Hindi commentary by Shri Satyapala Bhisagacharya Chaukhambha Sanskrit Series, Varanasi, 2008.

*Sushruta Samhita by Ambika Dutta Shastri, Chaukhambha Sanskrit Sansthana, Varanasi, 14th edition, 2000.

*Science Daily New Sleep Cycle Discovery Explains Why Fatty Diets During Pregnancy Make Kids Obese) 2010.

*J. Nutr. III: Effects of Fasting During Pregnancy on Maternal and Fetal Weight 1823-1832, 1981

*Anderheim L, Holter H, Bergh C and Moller A .Does psychological stress affect the outcome of in vitro fertilization? Hum Reprod, 2005; 20:2969–2975.

*Chaudhuri JD. An analysis of the teratogenic effects that could possibly be due to alcohol consumption by pregnant mothers, Indian J Med Sci .2000;54:425–431.

*Collier AC, Tingle MD, Paxton JW, Mitchell MD and Keelan JA (2002)Metabolizing enzyme localization and activities in the first trimester human placenta: the effect of maternal and gestational age, smoking and alcohol consumption. Hum Reprod 17, 2564–2572.

*Day NL, Jasperse D, Richardson G, Robles N, Sambamoorthi U, Taylor P, Scher M, Stoffer D and Cornelius M .Prenatal exposure to alcohol: effect on infant growth and morphologic characteristics, Pediatrics, 1989; 84,536–541.

*Nasseri A and Grifo JA .Genetics, age, and infertility. Maturitas, 1998; 30:189–192.

*Randall CL (1987) Alcohol as a teratogen: a decade of research in review. Alcohol Alcohol Suppl 1,125–132

*Sheila Marcus, Juan F. Lopez, Susan McDonough, Michael J. MacKenzie, Heather Flynn, Charles R. Neal, Sheila Gahagan, Brenda Volling, Niko Kaciroti, Delia M. Vazquez Infant Behavior and Development .ELSEVIER publication, 2011; 3426-34 .

*Wisborg K, Kesmodel U, Bech BH, Hedegaard M and Henriksen TB.Maternal consumption of coffee during pregnancy and stillbirth and infant death in first year of life: prospective study. BMJ , 2003;26:420.

*P onsonby AL, Lucas RM Lewis S Hallday J: Vitamin D status during pregnancy and aspects of offspring health, Nutrition. 2010.

*Fried, P., and Makin, J. Neonatal behavioural correlates of prenatal exposure to marihuana, cigarettes and alcohol in a low risk population. Neurotoxicology and Teratology 1987; 9:1–7.

*Picone,T, Allen, L and olsen, P. Pregnancy outcome in North American women: II. Effects of diet, cigarette smoking, stress, and weight gain on placentas, and on neonatal physical and behavioral characteristics. American Journal of Clinical Nutrition, 1982; 36:1214–1224.

*U.S. Department of Health and Human Services (USDHHS). *The Health Consequences of Smoking for Women*. HHS Pub. No. 396. Rockville MD: USDHHS, 1980

*YERUSHALMY, J. The relationship of parent's cigarette smoking to



outcome of pregnancy complications as to the problem of inferring causation from observed associations. *American Journal of Epidemiology*, 1971; 93: 443-456.

*Persson, P., Grennert, L., gennser, G.A study of smoking and pregnancy with special reference to fetal growth. *Acta Obstetrics and GynecologyScandinavia* 1978;78:33-39.

*National Cancer Institute (NCI). *Health Effects of Exposure to Environmental Tobacco Smoke: The Report of the California Environmental Protection Agency*. Smoking and Tobacco Control Monograph No. 10.NIH Pub. No. 9904645. Bethesda, MD: U.S.Department of Health and Human Services, NationalInstitutes of Health, National Cancer Institute, 1999.

*ACOG Committee on Practice Bulletin, ACOG practice bulletin,Chronic hypertension in pregnancy. *Obstet Gynecol*2001; 98:177-185.

*Singh M, Perinatal Pharmacology, Care of the newborn, Sagar Publications New Delhi, 2010.

*Rochupillai N, Godbole MM, Pandav CS, Karmarkar MC, Ahuja MMS, Neonatal thyroid status in iodine deficient environments of the sub-Himalayan region *Indian J Med Res* 1984; 80:293.

*Ferran Ballester Marisa Estarlich, Carmen Iniguez, Sabrina Llop, Rosa RamónAna Esplugues, Marina Lacasañaand Marisa Rebagliato.Air pollution exposure during pregnancy and reduced birth size: a prospective birth cohort study in Valencia, Spain.2010.

*Richards M, Hardy R, Kuh D, Wadsworth ME: Birth weight, postnatal growth and cognitive function in a national UK birth cohort. *Int J Epidemiol* 2002; 31:342-348Barker DJ: The origins of the developmental origins theory. *J Intern Med* 2007; 261:412-417.

*Zuckerman, B.,et.al . Effects of maternal marijuana and cocaine use on fetal growth. *New England Journal of Medicine*1989; 320, 762.



