

# Sociocultural, Healthy Nutrition & Eating, Exercise Pattern and Use of Ayurvedic Medicines in Pregnancy.

Ingle P.V.\*<sup>1</sup>, Chaudhari S.L.<sup>1</sup>, Dighore P.N.<sup>2</sup> and Surana S.J.<sup>1</sup>

<sup>1</sup>Department of Clinical Pharmacy, R. C. Patel Institute of Pharmaceutical Education and Research, Shirpur-425405, Dist: Dhule, Maharashtra, India.

<sup>2</sup>Indira Gandhi Memorial Hospital, Shirpur-425405, Dist: Dhule, Maharashtra, India.

## ABSTRACT

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Pregnancy is a convoluted process in women's life. We still do not understand all the intricacies of pregnancy, in terms of both foetal development and a mother's ability to adapt to and provide for a foetus. For better results the main aim is to maintain good health of mother and her baby throughout the pregnancy. For that antenatal care is most important, in which all the necessary tests and findings are performed to ensure healthy outcome of pregnancy. Proper weight gain is a symbol of healthy pregnancy, which directly affects on neonatal birth weight. So by gaining proper weight in pregnancy we can avoid risk of delivering the high or low birth weight baby. There is major risk of delivering Intra Uterine Growth Restriction (IUGR) babies which is one of the complications in pregnancy. So that proper weight gain can avoid the risk like IUGR. Needs of the body are increases in pregnancy because mother requires extra food, supplements for her baby, so healthy diet must require for mother. Also supplements like iron, calcium, protein etc. are essential at this stage because these supplements also have specific role in proper growth of baby and also for mother's body requirements. From ancient times in India, there is use of the ayurvedic formulations in pregnancy was seen. Ayurveda helps to cure many diseases or disorders in pregnancy. Also some herbal drugs may be used during pregnancy for many problems. So these all issues are helpful to maintain proper health in pregnancy and its outcome.

**Keywords:** Pregnancy, weight gain, IUGR, nutrition, ayurvedic medicine, diet, exercise.

## INTRODUCTION

Pregnancy is the most astounding process that the human body can undergo, woman's body can support the development of another human being from a single cell to a newborn is truly a marvel. We still do not understand all the intricacies of pregnancy, in terms of both fetal development and a mother's ability to adapt and provide for a fetus, so proper care of the women in pregnancy is essential. Throughout pregnancy proper antenatal care (ANC) is good for women and fetus which is growing inside women's womb.<sup>1</sup>

In whole pregnancy, many anatomical and physiological changes in women's body are seen, out of which weight gain in pregnancy is important for mother and her baby. Weight gain in pregnancy directly affects the neonatal birth weight. So proper weight gain in pregnancy is essential because we can avoid less birth weight baby or high birth weight baby

because both are dangerous for health of baby. Also by gaining proper weight we can avoid Intra Uterine Growth Retardation (IUGR) like problems in pregnancy.<sup>2,3</sup>

In pregnancy, the body needs increases so healthy eating which also includes nutrients like iron, calcium, protein etc. are essential for health of women and her child's growth. For maintaining good health in pregnancy some exercises are also required.<sup>4,5</sup>

From ancient times in India, use of the ayurvedic formulations in pregnancy is seen which helps to cure many diseases in pregnancy. Also herbal drugs may be used in pregnancy as they are safer during pregnancy for many problems<sup>6,7</sup>, so all these factors are helpful to maintain proper health in pregnancy.

### Antenatal care in pregnancy

The care that woman receives during pregnancy, helps to ensure healthy outcomes for women and newborns (*WHO/UNICEF 2003*). Antenatal care is a key entry point for a pregnant woman to receive a broad range of health promotion and preventive health services including nutritional support and prevention and treatment of anemia, prevention, detection and treatment of malaria, tuberculosis

#### Address for Correspondence:

Pravinkumar V. Ingle, Assistant Professor, Department of Clinical Pharmacy, R. C. Patel Institute of Pharmaceutical Education & Research, Shirpur-425405, Dist: Dhule, Maharashtra, India.

E-mail: prabhu4ever2000@rediffmail.com

and sexually transmitted diseases (Particularly prevention of HIV transmission from mother to child); and tetanus toxoid immunization. Antenatal care is the opportunity to promote the benefits of skilled attendance at birth and to encourage women to seek the post partum care of themselves and their newborns. Antenatal care is the essential link between household to hospital care continuum. It is an intervention that can be provided at both household and peripheral facility levels and helps assure the link to higher levels of care when needed (USAID).<sup>8</sup>

**Weight gain**

Woman's weight at the start of pregnancy is one of the most important modifiers of pregnancy weight gain and has impact on a mother's and her baby's health. Body mass index (BMI, a measure of body fat based on weight and height) is the best available measure of prepregnancy weight, has been updated in the new guidelines to the categories developed by the World Health Organization (WHO) and adopted by the National Heart, Lung, and Blood Institute (NHLBI) (IOM).

**Table 1: Recommendation by IOM for total and rate of weight gain during pregnancy, prepregnancy BMI**

Prepregnancy BMI	BMI+ (kg/m2) (WHO)	Total Weight Gain Range (lbs)	Rates of Weight Gain 2nd and 3rd Trimester (Mean Range in lbs/wk)
Underweight	<18.5	28–40	1(1–1.3)
Normal weight	18.5-24.9	25–35	1(0.8–1)
Overweight <sup>2</sup>	5.0-29.9	15–25	0.6 (0.5–0.7)
Obese	≥ 30.0	11–20	0.5 (0.4–0.6)

Optimal weight gain during pregnancy and a desirable foetal outcome may be a result of synergistic effects of improved food intake, food supplementation, improved micronutrient intake, education and the environment of the pregnant woman and her family.<sup>2</sup>

If the diet is not enough, with less than the required amount of calories, the woman might gain only 5.6 kg during her pregnancy. An inadequate dietary intake can be suspected if the woman has gained less than 2 kg per month. She needs to be put on food supplementation. Having a large baby (more than 9 lbs) (4.1 kg) which can results in an increased risk of weight gain as a teenager and additional health-related problems such as heart disease and diabetes.

Less than half of total weight gain resides in the foetus, placenta and amniotic fluid. The remainder is found in maternal reproductive tissues, fluid, blood and maternal

stores (largely composed of fat).

The increasing subcutaneous fat in abdomen and thighs serves as energy reserve during pregnancy and lactation.

By full term, average weight gain during pregnancy for a normal healthy woman with desirable body weight is 12.5kg ranging between 11 – 13 kg. The pattern of weight gain is as important as total weight gain. During first trimester there is little increase in weight (0.7 to 1.4kg). Thereafter a steady gain of 0.4kg/ week is desirable.

Low maternal pre-pregnancy BMI is associated with adverse outcomes (preterm birth, reduced infant head circumference, IUGR), but the threshold of BMI at which the risk increases is not well defined.<sup>9</sup>

Weight gain during pregnancy is more strongly associated with neonatal birth weight than prepregnancy body mass index. Neonatal birth weight was not correlated with maternal working status, socio-economical status and was not differentiated between primipara and multipara status.<sup>10</sup>

**Table 2: Analysis of weight gain (g) in pregnancy**

Components	Period of gestation			
	Upto 10 weeks	Upto 20 weeks	Upto 30 weeks	Upto 40 weeks
Foetus and placenta	55	720	2350	4750
Uterus and breast	170	765	1170	1300
Blood	100	600	1300	1350
Extracellular water	-	-	-	1200
Fat	325	1915	3500	4200
Total	650	4000	8500	12600

There is influence of the sociocultural, demographical and behavioural on the low perinatal weight gain among adult women with low and normal BMI. These factors include socioeconomic status, age, education, ethnicity, and psychological factors such as depression, stress, anxiety and attitude towards weight gain.<sup>11</sup>

**Low birth weight baby (LBW)**

The weight of the infant at birth is a powerful predictor of infant growth and survival, and is dependent on maternal health and nutrition during pregnancy. Low birth weight (LBW) is defined as weighing less than 2,500 g at birth<sup>2</sup>. Low birth weight leads to an impaired growth of the infant with its attendant risks of a higher mortality rate, increased morbidity, impaired mental development, and the risk of chronic adult diseases. Infants who weight 2,000-2,499 g at birth have a four-fold higher risk of neonatal death than those who weight 2,500-3,499 g. The more severe the growth restriction within

the LBW category, the higher is the risk of death.<sup>12,13</sup>

Chronic moderate malnutrition and anaemia during pregnancy may result in still birth and Low Birth Weight (LBW) babies weighing less than 2500g. A large number of such babies are premature (<37 weeks of gestation) and rest suffer from Intra Uterine Growth Restriction

(IUGR). IUGR results in babies which are Small For Date (SFD) i.e., infants born after 40 weeks of gestation but small because of malnutrition during intrauterine growth.<sup>14</sup>

### High Birth weight baby (HBW)

Infant born with a birth weight of more than 4000 g is called as high birth weight baby. In most of the studies it is found that the proportion of infants born with a birth weight above 4000 g is about 20.0% in world.

When birth weight exceeds 4000 g, the risks of perinatal mortality, brachial palsy, meconium aspiration, clavicular fracture, shoulder dystocia, and low Apgar score are increases. This makes identification of risk factors for delivery of large infants important.

It was found that high maternal prepregnancy weight and height, being a nonsmoker, a low level of caffeine intake, and a high educational level increased the risk of delivering an infant with a birth weight above 4000 g. and findings related to the mother's and father's own birth weight, parity, maternal age, and height were less consistent.<sup>3</sup>

### IUGR (Intrauterine growth restriction)

Intrauterine growth restriction (IUGR) is an important clinical problem associated with increased perinatal mortality and morbidity. It is related with to an inadequate in the supply of nutrients and or oxygen to the fetus through introplacental unit. The most preferred small for gestational age (SGA) definition is birth weight below the 10<sup>th</sup> percentile, adjusted for gestational age. The incidence of IUGR is about 4 to 7%. A variety of hormones are involved. IUGR may cause due to chromosomal defects, smoking, early-onset preeclampsia (<34 weeks), connective tissue and inflammatory rheumatic diseases, maternal infections, several drugs, twin-to twin transfusion, anorexia nervosa, low maternal pre-pregnancy or small weight gain during pregnancy. Also, high hemoglobin (Hb) levels during the first 10-20 weeks of pregnancy may also cause IUGR. Complications due to IUGR include fetal or neonatal death, dysmaturity, and physical as well as temporary or permanent mental defects. Low birth weight children may have behavioural problems, psychiatric disorders and lower intelligence test scores later in life. Fetal changes of lipid metabolism and homeostasis in IUGR may place the grown adult at risk for hypertension, diabetes mellitus and coronary artery disease. Mothers of low weight offspring have an increased risk for cardiovascular and kidney disease later in life.<sup>15</sup>

**Table 3: Risk factors associated with IUGR**

Maternal factors	Placental factors	Fetal factors
<b>Vascular disease</b>		
Preeclampsia	Abnormal trophoblastic invasion	Genetic/constitutional e.g. race
Hypertension	Partial placental abruption	Chromosomal abnormalities
Diabetes mellitus	Placental villitis	Congenital malformations.
	Circumvallate placenta	
	Chorioangiomata	
	Hypercoiled cord	
	Velamentous cord insertion	
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<b>Heart disease</b>		
<b>Lung disease, asthma</b>		
<b>Malnutrition</b>		
Low maternal weight		
Nutritional deficiencies		
Iron deficiency		

## Causes of IUGR:

### • Diseases of the immune and vascular system:

Vascular diseases due to preeclampsia, diabetes mellitus, renal disease or collagen vascular disease are the most common causes of IUGR. Hemodynamic studies Shows that the blood supply to the fetoplacental unit is impaired in preeclampsia and SGA and that physiological changes in the spiral arteries are restricted to the decidual segment in such case. Serious essential hypertension (diastolic blood pressure > 110 mm Hg) before 20 weeks gestation increased the risk of early IUGR and premature delivery.<sup>10</sup>

### • Psychological, social factors and working conditions:

The IUGR contributing factors were increased psychosocial stressors, susceptibility to infections or smoking, low folate intakes and hyperhomocysteinemia. Low maternal education, thought to be associated with SGA, was not a risk factor when data were adjusted for smoking.<sup>16</sup>

### • Infections:

Many types of infections may contribute to IUGR. *Helicobacter pylori* infections during pregnancy may cause IUGR.<sup>11</sup> Factors associated with IUGR were short status, primigravida, and malaria at delivery. The risk of IUGR was particularly associated with maternal malnutrition in primigravidae. From a global view malaria is a frequent avoidable cause of IUGR. Toxoplasmosis and syphilis are also associated with IUGR.<sup>17</sup>

### • Twin delivery:

In twin pregnancies 15-30% was associated with IUGR and premature delivery<sup>18</sup>. Monochorial twin pregnancies with intra-placental anastomoses may permit twin to twin transfusion and thus lead to a twin-twin transfusion syndrome (TTTS). In TTTS pregnancies leptin levels in recipient twins were three times higher than in IUGR donor twins, whereas in twin pregnancies with one IUGR twin, but without TTTS, the leptin differences were only 2-fold.<sup>19</sup>

### • Drug side effects:

The use of the beta blocker atenolol at conception and during early pregnancy, but not during the second or third trimester, may cause IUGR. It has also been assumed that antiepileptic drugs may inhibit fetal growth. Corticosteroids are used to treat systemic *lupus erythematosus (SLE)*, chronic regional enterocolitis and ulcerative colitis during pregnancy and in high doses may cause IUGR. Warfarin treatment during pregnancy may lead to miscarriage, microencephalia, blindness, prematurity and IUGR.<sup>20</sup>

### • Umbilical cord anomalies:

Pregnancies with one umbilical artery may be associated with chromosome defects, fetal anomalies, IUGR and increased fetal mortality. Both hypo- and hypercoiled cords may cause reduced umbilical blood flow, decreased placental blood flow and consequently IUGR.<sup>4</sup>

### • IUGR and post term delivery:

From many evidences it is found that relationship between IUGR and pubertal development indicating changes in timing and progression of puberty. These changes are part of a growing list of IUG related diseases which includes short stature and polycystic ovary.<sup>4</sup>

### • Fetal and neonatal consequences of IUGR:

IUGR is associated with fetal hypoxia, hypoglycemia, aspiration of meconium and neonatal respiratory problems and central nervous disturbances (CNS) such as intraventricular hemorrhage, periventricular leukomalacia and cerebral infarctions.<sup>21,22</sup>

## Healthy eating in pregnancy

The basic principle of meal planning remains the same, but since the nutritional requirements increase during pregnancy, emphasis should be in including nutrient dense foods i.e., foods that give more nutrients per calorie consumed. During early months, the mother often suffers from morning sickness due to the hormonal and physiological changes, when she should be given small amounts of foods with increased frequency. Solid carbohydrate rich foods like bread, biscuit and fruit given in the morning or before meals helps to relieve nausea. Also fried, rich, strongly flavoured and spicy foods need to be avoided. To meet increased requirements the mother should consume extra food. The mother can be given nutritious snacks in between meals rather than three meals a day thus increasing the frequency of feeding. Her feeding pattern should be 5-6 meals a day. Protein needs can be met by including good quality protein foods like meat, milk, egg, fish. Protein can also be obtained from pulses like soyabean and groundnut at a lower cost. To improve protein quality, a combination of plant proteins, as that in cereals and pulses, with small amount of animal protein should be used. To meet additional iron needs foodstuffs like whole grain cereals, rice flakes, puffed rice, dried fruits, green leafy vegetables, eggs, enriched cereals and organ meats can be given. Food rich in dietary fibre like fresh fruits, vegetables, whole grain cereals with plenty of fluids need to be included. This is to ward off constipation which is a common problem during pregnancy.<sup>4,23,24</sup>

**Table 4: Balanced Diet for pregnant women**

Sr. No.	Food Group	Quantity in gms
1	Cereals and millets	300
2	Milk (ml)	500
3	Roots and Tubers	100
4	Green leafy vegetables	150
5	Other vegetables	100
6	Fruits	200
7	Sugar	20
8	Fats and oils (visible)	30

**Role of supplements in pregnancy**

**1. Protein:** The additional protein is essential for

- Growth of the foetus
- Development of placenta
- Enlargement of uterus, mammary gland
- Increased maternal blood volume
- Formation of amniotic fluid
- Preparation for labour, delivery, post partum period and lactation by maternal tissues.

**2. Fat:**

Linoleic acid requirements during this stage are 4.5 percentage of total energy. Of this, some of the essential fatty acid needs are met with by the invisible fat. Therefore an intake of 30g of visible fat has been suggested to meet the essential fatty acid needs.

**3. Calcium:**

The additional calcium is needed for the growth and development of bones as well as teeth of the foetus and also for the protection of calcium resources of the mother to meet the high demand of calcium during lactation.

**4. Iron:**

The requirement of iron increases from 30mg/day to 38mg/day during pregnancy. The increased requirement of 8mg/day is due to,

- Expansion of maternal tissues including red cell mass, iron content of placenta and blood loss during parturition.
- To build the iron store in foetal liver to last for at least 4-6 months after birth. This is because the baby's first food milk is deficient in iron. Generally infants are born with a high level of iron, 18-22g/100ml.

**5. Zinc:**

Deficiency of zinc adversely affects the outcome of pregnancy. Apart from being a component of insulin and enzyme systems, it also participates in the synthesis of DNA and RNA, playing a significant role in reproduction. Hence

zinc deficiency leads to foetal mortality, foetal, malformations and reduced intra uterine growth rate. The risk of LBW babies doubles and preterm delivery increases three times due to low zinc intake during pregnancy.

**6. Vitamins:**

• **Vitamin A**

Vitamin A requirements during pregnancy have been computed based on the vitamin A content of liver of the newborn. The additional intake works out to 25 µg/day throughout pregnancy. Since this constitutes a very small fraction of the RDA for normal women, no additional allowance during pregnancy is suggested.

• **Vitamin D**

Vitamin D is essential as it enhances maternal calcium absorption. Its active form calcidiol and calcitriol can pass through placenta with ease and help in calcium metabolism of foetus.

**Table 5: ICMR (Indian Council of Medical Research)****Recommended dietary allowances for an expectant mother**

Nutrient	Normal Adult Woman	Pregnant Woman
<b>Energy (K/cal)</b>		
Secondary	1875	2175
Moderate	2225	2525
Heavy	2925	3225
Calcium (mg)	400	1000
Protein (g)	50	65
Fat (g)	20	30
Iron (mg)	30	38
Vitamin A (µg)	600	600
B carotene (µg)	2400	2400
<b>Thiamine (mg)</b>		
Secondary	0.9	1.1
Moderate	1.1	1.3
Heavy	1.2	1.4
<b>Riboflavin (mg)</b>		
Secondary	1.2	1.3
Moderate	1.3	1.5
Heavy	1.5	1.7
Pyridoxine (mg)	2.0	2.5
Ascorbic acid (mg)	40	40
<b>Niacin (mg)</b>		
Secondary	12	14
Moderate	14	16
Heavy	16	18
Folic acid (µg)	100	400
Vitamin B <sub>12</sub>	1	1

- **Thiamine, Riboflavin, Niacin**

As the energy requirement increases during pregnancy, the requirement of these vitamins also increases correspondingly.<sup>25</sup>

### **Role of Ayurveda in pregnancy**

During pregnancy there is tendency to put on undue weight. At this time, dieting is not suitable advice. Use of honey is best, as it helps one to lose weight. Harita appreciates the use of honey with Yogurt in 6th month. Rudolph Ballentine writes "The Ayurvedic scriptures say that Yogurt is an excellent food if it is taken with honey. On this basis it is also said that the diabetic can take honey without harm, whereas he should avoid sugar assiduously. Conventional modern medicine by contrast, has tended to forbid honey to the diabetic on the rationale that it is carbohydrate. Interestingly enough however, honey contains primarily fructose, which as we have seen, is different from most sugars in that it does not require insulin for its metabolism."<sup>6</sup>

Use of ghee (clarified butter) is also advised to pregnant lady. It promotes digestion which is in accordance with research which has shown that full fat Soya flour is digested with less gas than the defatted preparations. Use of Mamsa Rasa (meat soup) is also advised during pregnancy. It is sufficient to maintain the serum protein level in body from 6th month onwards. Use of Gokhru (*Tribulus terrestris*) is also beneficial. There is tendency of oedema on feet or same generalized in last trimester of pregnancy. Probably it checks it and not allows it to be pathological one.<sup>11</sup>

### **Herbal drugs in pregnancy**

Women may choose to use herbal supplements because they consider them safer during pregnancy than pharmaceutical products. Herbs are not non-toxic just because they are natural. Medicinal herbs may contain powerful, pharmacologically active compounds. Several animal studies described the adverse effects of herbal medicines to the fetus, such as congenital malformations<sup>26-29</sup>, intrauterine growth retardation, and reduction of fetal survival rate. A human study in South Africa reported fetal distress as the outcome of taking herbal medicines during pregnancy. Attitude towards herbal medicines is a factor that influences use during pregnancy. Other possible associated factors are age, education level, and income.<sup>28</sup>

In one study, Two-hundred ten women (110 "users," 100 "non-users") were studied. The probability of using herbal medicines among women who had negative attitudes towards the use of herbal medicines was 50.0% less compared to those who had positive attitudes (OR = 0.51, 95% CI = 0.29 - 0.92). Women who had a positive attitude towards the safety of herbal medicines were less likely to use herbal medicines

during pregnancy. There were no significant associations between usage and sociodemographic features, such as age, income, race, and education.<sup>30-32</sup>

### **Exercise in pregnancy**

Many women enter pregnancy with regular aerobic and strength-conditioning activities already a part of their daily lives. Other women see pregnancy as an opportunity to modify their lifestyles to include more health.

Recent investigations, focusing on both aerobic and strength-conditioning exercise regimens in pregnancy, have shown no increase in early pregnancy loss, late pregnancy complications, abnormal fetal growth, or adverse neonatal outcomes, suggesting that previous recommendations have been overly conservative.<sup>23,24</sup>

- **When and how to start exercise:**

Many women find that the best time to initiate an exercise program is in the second trimester, when the nausea, vomiting, and profound fatigue of the first trimester have passed and before the physical limitations of the third trimester begin. Women who have been exercising prior to pregnancy may continue their exercise regimens throughout pregnancy.<sup>33,34,38-41</sup>

- **Safety precautions:**

Some sport activities carry significant risk in pregnancy and are considered contraindicated. Women should not scuba dive in pregnancy, as the fetus is not protected from decompression sickness and gas embolism.<sup>33</sup> Women are cautioned about the potential for loss of balance and fetal trauma if they participate in horseback riding, downhill skiing, ice hockey, gymnastics, or cycling during pregnancy. Under normal circumstances and with appropriate hydration, moderate exercise at altitudes up to 1800–2500 m (6000–8250 ft) does not appear to significantly alter maternal or fetal well-being. However, women should be wary of hiking in a location where they might fall.<sup>34,36</sup>

### **CONCLUSION**

From this review we can conclude that proper care in the pregnancy is required. As, concern with knowledge of antenatal care mother get maintain a good health. By gaining proper weight, mother can avoid problems like high or low birth weight baby and IUGR. Eating proper diet with proper supplements like iron, calcium, protein, vitamins and exercise in pregnancy maintain proper health. Use of ayurvedic preparations and herbal formulations are beneficial in the safe pregnancy and its outcome.

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