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Review Article

**PREGNANCY: AN OVERVIEW**Abarna. S<sup>1</sup>, Anu Prasad. N<sup>1</sup>, Gopi Krishnan. S<sup>2</sup><sup>1</sup>Doctor of Pharmacy, Arulmigu Kalasalingam College of Pharmacy, Krishnankoil, Tamil Nadu, India.<sup>2</sup> Assistan Professor, Department of Pharmacology, Arulmigu Kalasalingam College of Pharmacy, Krishnankoil, Tamil Nadu, India.**Article Received:** September 2022    **Accepted:** September 2022    **Published:** October 2022**Abstract:**

*Pregnancy is the period of fetal development woman's womb or uterus when the body faces physiological and metabolic changes. Anemia remains major problem during pregnancy. About 4 hormones progesterone, estrogen, hGC, prolactin involve in pregnancy changing their concentrations during 3 trimesters. Dietary habits plays a vital role in maintaining healthy pregnancy and balancing the amount of hormones required. It is a well- understood scientific concept that the nutritional status of the pregnant woman affects the outcome of the pregnancy, especially related to birth weight. Low birth weight is associated with an increased risk for infant deaths and developmental disabilities and seen more often in children from under nourished and underweight mothers.*

*Key words: Pregnancy, Trimester, Nutrition*

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**INTRODUCTION:**

Pregnancy is the term used to describe the period in which a fetus develops inside a woman's womb or uterus. Pregnancy is a time of profound physiological changes in a woman's body. These unique changes during pregnancy challenge the clinicians in managing disease states in the selection of medications best suited to treat them. Pregnancy should not deter clinicians from providing their patients with appropriate management of their medical conditions. U.S. Food and Drug Administration (FDA) have enough information to determine the teratogenic risks.[1] The objective of the study was to evaluate the current drug utilization pattern during pregnancy (2)The retrospective study involved data collected from 150 pregnant women who have delivered in the tertiary care hospital. Information regarding the gravida, number of ANC visits per pregnant woman, disease status and the drugs prescribed during pregnancy was collected. Nutritional supplements including iron and folic acid supplements were the most commonly prescribed in more than 93% which is followed by tetanus toxoid(92%). (3)Drug utilization studies can help in minimizing the inherent risk of drug use in pregnancy, by establishing a profile of the safety and efficacy of drug consumption. (4)Pregnancy is a period of transition with important physical and emotional changes [5] Even in uncomplicated pregnancies, these changes can affect the quality of life of pregnant women and affect both maternal and infant health (pregnancy monitoring, pregnancy outcomes, maternal postpartum health, and the psychomotor development of the infant) [6,7,8,9,10]. A healthy, balanced diet during pregnancy is essential to support optimal growth and development of the fetus and the physiological changes that occur in the mother. Fundamental aspects of healthy dietary behaviors during pregnancy include consuming foods that contain optimal amounts of energy as well as macro and micronutrients, achieving appropriate weight gain, adhering to general and pregnancy-specific food safety recommendations, and avoiding ingestion of harmful substances [11,12]. During pregnancy, motivation for eating a healthy diet may change relative to the non-pregnant state as women prepare for motherhood and consider the impact of their dietary intake on the baby's health [13]. Although most women are aware that healthy eating is important during pregnancy, women may lack knowledge of specific dietary recommendations or may not have the skills required to improve their diet [14]. Healthy eating may also be challenging during pregnancy as women face barriers such as food aversions, cravings, nausea, vomiting, tiredness, constipation, hemorrhoids, and heartburn [15].

Women may receive and follow advice from a variety of sources, including health professionals, peers, and educational resources, which influences their choices during pregnancy [16]. Nutrition plays an important and definite role in the course of pregnancy for the maintenance of sound maternal health.[17] It is vitally important to eat more healthy foods in pregnancy than at any other time in a woman's life. If maternal reserves are adequate, the fetus is well protected. When nutritional status is poor and nutritional intake is less, then hormonal balance and maternal reserve is jeopardized. If pregnancy is healthy, the body undergoes many changes to allow for the growth of fetus and to prepare the mother for labour, delivery and lactation. Many of these changes increase the nutritional requirement of the mother.[18] To meet nutritional needs, pregnant women are encouraged to consume a diet rich in vegetables, fruits and whole grains and to take a daily vitamin and mineral supplement to guarantee adequate intake of iron and folic acid. Maternal weight gain is a necessary physiologic change during pregnancy. Interestingly the fetus, placenta and amniotic fluid account for less than half of the total amount of weight gained. Most of the added weight is found in maternal reproductive tissue, fluid, blood and maternal fat stores, which serve as an energy reserve during pregnancy and lactation. [19] Effect of malnutrition during pregnancy is well recognized. [20] Dietary habits differ from region to region. It also differs from culture to culture and custom to custom. The ill effects of malnutrition during pregnancy are well recognized. It can be avoided by adequate intake of nourishing foods. Maternal anemia is a burning national health problem and has been related to poor foetal outcome. Maternal anemia is a burning national health problem and has been related to poor foetal outcome. Pregnancy is a time when metabolic changes in the mother were carefully regulated to provide optimum substrate to both mother and fetus. Anemia especially iron deficiency anemia has been considered as one of the main public health problems. Iron deficiency anemia is one of the most prevalent nutritional deficiency disorders among women during pregnancy in the developing countries. The prevalence of anemia at global level is reported to be 55.9 percent among the expectant mothers.[21]

**Pregnancy time period**

Pregnancy usually lasts about 40 weeks, or just over 9 months, as measured from the last menstrual period to delivery. Health care providers refer to three segments of pregnancy, called trimesters. The major events in each trimester are described below [22] First trimester [ week 1 – week 12 ]

- The events that lead to pregnancy begin with conception, in which a sperm penetrates an egg.
- The fertilized egg (called a zygote) then travels through the woman's fallopian tube to the uterus, where it implants itself in the uterine wall.
- The zygote is made up of a cluster of cells that later form the fetus and the placenta.
- The placenta connects the mother to the fetus and provides nutrients and oxygen to the fetus [23]

Second trimester [ week 13 – week 28 ]

- Between 18 and 20 weeks, the typical timing for ultrasound to look for birth defects, you can often find out the sex of your baby.
- At 20 weeks, a woman may begin to feel movement.
- At 24 weeks, footprints and fingerprints have formed and the fetus sleeps and wakes regularly.
- According to research from the NICHD Neonatal Research Network, the survival rate for babies born at 28 weeks was 92%, although those born at this time will likely still experience serious health complications, including respiratory and neurologic problems. [24]

Third trimester [ week 29 – week 40 ]

- At 32 weeks, the bones are soft and yet almost fully formed, and the eyes can open and close.
- Infants born before 37 weeks are considered preterm. These children are at increased risk for problems such as developmental delays, vision and hearing problems, and cerebral palsy. Infants born between 34 and 36 weeks of pregnancy are considered to be "late preterm." [ 25]
- Infants born in the 37th and 38th weeks of pregnancy—previously considered term—are now considered "early term." These infants face more health risks than infants who are born at 39 weeks or later, which is now considered full term. [26]
- Infants born at 39 or 40 weeks of pregnancy are considered full term. Full-term infants have better health outcomes than do infants born earlier or, in some cases, later than this period. Therefore, if there is no medical reason to deliver earlier, it is best to deliver at or after 39 weeks to give the infant's lungs, brain, and liver time to fully develop. [27,28,29]
- Infants born at 41 weeks through 41 weeks and 6 days are considered late term.

- Infants who are born at 42 weeks and beyond are considered post term. [29]

#### **Hormones during pregnancy**

Progesterone is largely produced by the corpus luteum until about 10 weeks of gestation. [30] When the pregnancy reaches term gestation, progesterone levels range from 100-200 ng/ml and the placenta produces about 250 mg/day. Almost all of the progesterone produced by the placenta enters the placenta, contrast to estrogen.

Progesterone is important for getting pregnant in the first place because it prepares uterus lining for the egg to implant and it acts as a muscle relaxant, preventing pregnant women's uterus from contracting until the onset of labour. Estrogen helps to regulate that progesterone while also maintaining the endometrial lining that is vital for the baby's development. Estrogen is believed to promote an increase in blood flow, which is important for nourishing the baby, but that extra blood flow has the side-effect of making pregnant women's breasts achy and tender. [31]

Human chorionic gonadotropin, or hCG, is known as the pregnancy hormone because it's generally only produced during pregnancy. Levels of hCG will rise rapidly, doubling every few days before reaching their peak in the first eight to 11 weeks. Thyroid-stimulating hormone, or TSH, is produced in the pituitary gland in the brain and it helps regulate the other important thyroid hormone. Cortisol also increases during pregnancy, but despite what hear about this stress hormone, it's not all bad—it's important for the developing fetus because it can help regulate your metabolism and control blood sugar levels. Human placental lactogen (HPL), a hormone secreted from the placenta, is thought to help the baby grow. It's also one of the main hormones connected to insulin resistance during pregnancy, or gestational diabetes, which sometimes develops in the second trimester and can lead to overgrowth of the baby.

Prolactin, a hormone that stimulates the development of the breast tissue to prepare for lactation, ramps up in the third trimester. Prolactin is 10 times higher at the end of pregnancy than it is at the beginning. Though pregnant women body doesn't actually produce milk at the breast until progesterone and estrogen drop after birth, it does start to get ready with colostrum, the first milk produce for the baby, while women still pregnant. Breasts may even start to leak a little bit before the baby is born.[ 32]

# Pregnancy Stages

The 9 months of pregnancy are divided into **three stages**, or trimesters, each with distinct characteristics in terms of mother's experiences and fetal development.

## FIRST TRIMESTER

- **Mom:** Rapid influx of hormones causes intense pregnancy symptoms



- **Baby:** First heartbeat at 8 weeks; grows to 2.9" and 0.8 oz.

## SECOND TRIMESTER

- **Mom:** Most symptoms lessen; pregnancy starts to show



- **Baby:** Gender reveal at 18 - 20 weeks; grows to 14" and 1.7 lbs.

## THIRD TRIMESTER

- **Mom:** Extra weight makes it harder to sleep and move



- **Baby:** All organs finish maturing; grows to 20.3" and 8.1 lbs.

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## Composition of the maternal diet

### Micronutrients

#### Iron

Iron is one of the most important micronutrients. The usual absorption from plants is low and could be further decreased by phytates and polyphenols, which are present in some plant-based products. The absorption of haem iron from meat is much higher. Inadequate iron intake during pregnancy is associated with cardiovascular risk to the offspring in adulthood. [33,34].

#### Iodine

Iodine is another very important micronutrient. Iodine deficiency has been revealed to be associated with postpartum hyperthyroidism, perinatal mortality and neonatal hypothyroidism. Inadequate iodine intake during pregnancy causes an increased risk of spontaneous abortion, higher mortality, birth defects, neurological disorders and brain damage [36]. Fish and shellfish, fruits, vegetables, milk, eggs and meat are the main source of iodine from the usual diet.

#### Calcium and vitamin D

The main source of calcium is milk and milk products (50%), cereals (11%) and vegetables (11%). It is crucial for bone metabolism but also related to birth weight, risk of preterm labour and appropriate blood pressure [37].

Early studies concerning vitamin D in pregnancy showed an association with preeclampsia and caesarean section but also glucose tolerance, abnormal foetal growth pattern, preterm birth and reproductive failure. In the first weeks of pregnancy, the level of the vitamin D metabolite 1,25(OH)<sub>2</sub>D<sub>3</sub> increases 2–3-fold, regardless of the level of intake, but the significance of this phenomenon is unknown. This mechanism could possibly maintain the required level during pregnancy if preconception stores were normal. Below adequate levels of 25(OH)D<sub>3</sub> (< 20 ng/ml) are related to adverse outcomes later in life, such as asthma, multiple sclerosis, neurological disorders and autoimmune conditions.

The main dietary sources of vitamin D are cod liver oil and fish. Smaller amounts are present in eggs, butter and cheese; however, the most important contributor to the general level is skin production upon exposure to UV radiation and additional supplementation.

#### Folates

Folates are extremely important for the prevention of neural tube defects. The RDA increases by up to 50%

in pregnancy, and the recommended supplementation dose is 400–800 µg from 2 months prior to conception onward, which is essential in the first trimester and could be continued after the 12th week of pregnancy [38].

#### BPA

Environmental exposure to harmful substances in pregnancy, especially those present in the diet, raises concerns. BPA is used for different types of food packaging and as food additives and has now become the focus of interest. Exposure to this substance has been associated with adiposity, energy balance [39] and thus can be related to obesity and neurological disorders such as ADHD, anxiety, depression and sexual dimorphic behaviors.

### Macronutrients

#### Protein

vegetarian diet can result in vitamin B12 and iron deficiency, as well as low birth weight, whereas a vegan diet can lead to inadequate intake of DHA, zinc and iron, as well as an increased risk of preeclampsia and inadequate brain development. [40].

In contrast, consumption of red meat, which was recently revealed to be associated with cancer risk, raises some concerns over pregnancy and protein requirements, but till now, there are no any evidences that this diet can negatively impact child's health [41].

#### Fat

Omega-3 fatty acids are beneficial for brain development and proper functioning of the retina. In many studies, maternal serum DHA concentration has been associated with neuronal development and plasticity, receptor-mediated signalling, membrane fluidity and the formation of second messengers.

#### Carbohydrates

Carbohydrates are an essential component of a healthy diet. However, increased caloric intake associated with increased fat and carbohydrate consumption with adequate protein has been associated with neonatal adiposity, which is obviously unfavorable [42].

### CONCLUSION:

A balanced diet, regular exercise and a healthy lifestyle are particularly important before and during pregnancy. With a purely plant-based (vegan) diet, intake of vitamin B<sub>12</sub>, DHA, zinc, protein, iron, calcium and iodine is critical. In particular, adequate

intake of vitamin B<sub>12</sub> is not possible with a purely plant-based diet without nutritional supplements and fortified foods. In addition to a balanced diet, women planning a pregnancy must take 400 µg of folic acid daily or equivalent doses of other folates in the form of a supplement. Supplementation must begin at least four weeks before conception and continue until the end of the first trimester of pregnancy.

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