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**COURSE: PHS 212**

**COLLEGE: MHS**

**LEVEL: 200**

**PHYSIOLOGICAL ADAPTAIONS OF THE FEMALE TO PREGNANCY**

During pregnancy, a woman’s body changes in many ways due to the effects of hormones. These changes can sometimes be uncomfortable, but most of time they are normal and enable her to nourish and protect the fetus, prepare her body for labour, and develop her breasts for the production of milk. Some the changes that occur during pregnancy are in the uterus, cervix and vagina, the cardiovascular system, gastrointestinal system, and urinary system, and changes in the breast and skin.

**CHANGES IN THE UTERUS, CERVIX AND VAGINA**

**THE UTERUS**

After conception, the uterus provides a nutritive and protective environment in which the fetus will grow and develop. It increases from the size of a small pear in its non-pregnant state to accommodate a full-term baby at 40 weeks of gestation. The tissues from which the uterus is made continue the uterus is made continue to grow for the first 20 weeks, and it increases in weight from about 50 to 1,000 grams. After this time, it doesn’t get any heavier, but it stretches to accommodate the growing baby, placenta and amniotic fluid. By the time the pregnancy has reached full term, the uterus will have increased to about five times its normal size: in height (top to bottom) from 7.5 to 30cm, in width (side to side) from 5 to 23cm and in depth (front to back) from 2.5 to 20cm.

At 12 weeks’ gestation (near the end of the first trimester, i.e. three-month period), the fundus (upper margin of the body of the uterus) may be palpated through the abdomen above the pubic bone (symphysis pubis). The size of the uterus usually reaches its peak at about 36 weeks’ gestation. The uterus may drop slightly as the fetal head settles into the pelvis, preparing for delivery.

**THE CERVIX**

The cervix remains 2.5 cm long throughout pregnancy, softening of the cervix occurs in response to increasing painless contractions of its muscular walls

**THE VAGINA**

The vagina also becomes more elastic towards the end of pregnancy. These changes enable it to dilate during the second stage of labour, as the baby passes down the birth canal.

 **CHANGES IN THE RSPIRATORY SYSTEM**

During pregnancy, the amount of air moved in and out of the lungs increases by nearly 50% due to two factors: each breath contains a larger volume of air and the rate of breathing (breaths per minute) increases slightly. During pregnancy, many women find they get short of breath. This because the growing crowds the mother’s lings and she has less room to breathe. But if a woman is also weak and tired, or if she is short of breath all of the time, she should be checked for signs of sickness, heart problems, anaemia or poor diet. Get medical advice if you think she may have any of these problems.

**CHANGES IN THE CARDIOVASCULAR SYSTEM**

**THE HEART**

The heart may increase in size during pregnancy due to an increase in its workload. It is increased due to the amount of blood pumped out of the heart each minute which is the cardiac output. The causes in the increase in the cardiac output are the increase in the resting heart rate, i.e. the number of heart beat per minute and the increase in the stroke volume, i.e. the volume of blood pumped out of the heart in a single heartbeat. During the second trimester of pregnancy, the mother’s heart at rest is working 40% harder than in her non-pregnant state. Most of this increase results from a more efficiently performing heart, which ejects more blood at each beat.

**BLOOD VOLUME**

Increases gradually by 30-50% in the pregnant woman, so by full term she has about 1.5 litres more blood than before the pregnancy. A higher circulating blood volume is required to provide extra blood flow through the placenta, so nutrients and oxygen can be delivered to the fetus. The volume blood plasma increases after about the sixth week of pregnancy. It reaches its maximum level of approximately 50% above non-pregnant values by the second trimester, and maintains this until full term.

**CHANGES IN THE URINARY SYSTEM**

The urinary system consists of the kidney and a tube called the urethra that passes out urine out of the body. The kidneys extract waste from the blood and turn it into urine. They must work extra hard to filter the mother’s own waste products from her blood, pus those of the fetus, and get rid of them in her urine. Therefore, there is also an increase in the amount of urine produced during pregnancy. Needing to urinate often is normal, especially in the first and last months of pregnancy. This happens because the growing uterus presses against the bladder. In late pregnancy, a woman often has to get up during the night to urinate, because fluid retained in the legs and feet during the day (oedema) is absorbed into the blood circulation when her legs are raised in bed. The kidneys extract the excess fluid and turn it into urine, so the bladder fills more quickly at night.

**CHANGES IN THE GASTROINTESTINAL SYSTEM**

During pregnancy, the muscles in the walls of the gastrointestinal system relax slightly, and the rate at which food is squeezed out of the stomach along the intestines is slowed down. Many women also have nausea in the first months of pregnancy. A burning feeling, or pain in the breasts, is called indigestion. It happens because as the pregnancy progresses, the growing baby crowds the mother’s stomach and pushes it higher than usual. The acids in the mother’s stomach that help digest food are pushed up into her chest, where they cause a burning feeling. This is not dangerous and usually goes away after the birth. If the mother has difficulty with nausea or indigestion, advise her to eat small, frequent meals. The mother should not lie down flat for 1 to 2 hours after eating, because this may cause these symptoms.

**CHANGES IN THE SKIN**

Changes in the woman’s hormones, and mechanical stretching of her growing abdomen and breasts, are responsible for several changes in the skin during pregnancy.

**LINEA NIGRA**

This dark line may appear between the umblilicus (belly-button) and the symphysis (pubic bone); in some pregnant women it may extend as high as the sternum. It is a hormone-induced excess production of brown material (pigment) in the skin cells in this area. After delivery, the line begins to fade, though it may never completely disappear.

**MASK OF PREGNANCY (chloasma)**

Some women produce a brownish pigmentation of the skin over the face and forehead, known as the mask of pregnancy or chloasma. It gives a bronze look. It begins about the 16th week of pregnancy and gradually increases, but it usually fades after delivery.

**STRETCH MARKS**

As the woman’s weight increases, stretching of the skin occurs over areas of maximal growth the abdomen, thighs and breasts. Pink or brownish stretch marks may appear in some women, which can be quite dramatic. They usually fade after delivery, although they never completely disappear.

**SWEAT GLANDS**

Activity of the sweat glands throughout the body usually increases the woman to perspire (sweat) more profusely than usual, particularly in hot weather or during physical work.

**CHANGES IN THE BREAST**

In early pregnancy, the breasts may feel full or tingle, and they increase in size as pregnancy progresses. The areola around the nipples darkens and the diameter increases. The Montgomery’s glands enlarge and tend to protrude. The surface blood vessels of the breast may become visible due to increased circulation, and this may give a bluish tint to the breasts. By the 16th week, the breasts begin to produce colostrum. This is the precursor of breastmilk. It is a yellowish secretion from the nipples, which thickens as pregnancy progresses. It is extremely high in protein and contains antibodies that help to protect the newborn baby from infection. Near the end of pregnancy, the nipples may produce enough colostrum to make wet patches on the woman’s clothes. After the baby is born, colostrum is produced for about the first three days, before the proper milk begins to flow. Make sure that the mother breastfeeds the colostrum to her baby, so he or she gets all the nutrients and antibodies it contains.

**CHANGES IN POSTURE AND JOINTS**

A pregnant woman’s entire posture changes as the baby gets bigger. Her abdomen transforms from flat or concave to very convex, increasing the curvature of her back. The weight of the fetus, the enlarged uterus, the placenta and the amniotic fluid, together with the increasing curvature of her back, puts a large strain on the woman’s bones and muscles. As a result, many pregnant women get back pain. Too much standing in one place or leaning forward can cause back pain, and so can physical work. Most kinds of back pain are normal in pregnancy, but it can also be a warning sign of a kidney infection. In addition, progesterone causes a loosening of ligaments and joints throughout the body. Pregnant women may be at greater risk of sprains and strains because of the ligaments are looser, and because their posture has changed.

**CHANGES IN BODY WEIGHT**

Weight increase in pregnancy is considered to be one favourable indication of maternal adaption and fetal growth. However, routine weighing of the mother during pregnancy is now thought to be necessary, because it does not correlate well with pregnancy outcomes. The expected increase in weight of a healthy woman in average pregnancy. A woman who is pregnant with more than one baby will have a higher weight gain than a woman with only one fetus. She will also require a higher calorie diet. A lack of significant weight gain may not be a cause for concern in some women, but it could be an indication that the fetus is not growing properly. Doctors and midwives may refer to this as intrauterine growth restriction (IUGR) of the fetus.