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Assignment Title: Discuss lactation and gestation period in a normal female
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Question
Discuss lactation and gestation period in a normal female.
I expect more on the physiology of lactation and details on the physiology of pregnancy in a normal woman

LACTATION

Lactation is the process where milk is produced and secreted from the mammary glands of the postnatal female breast in response to an infant sucking at the nipple. Breast milk provides ideal nutrition and passive immunity for the infant, encourages mild uterine contractions to return the uterus to its pre-pregnancy size, and causes a metabolic increase in the mother, consuming the fat reserves stored during pregnancy.

STRUCTURE OF THE LACTATING BREAST

The mammary gland is made up of milk-transporting lactiferous ducts that expand and branch during pregnancy in response to estrogen, growth hormone, cortisol, and prolactin. Clusters of breast alveoli bud from the ducts and expand outward toward the chest wall in response to progesterone. Milk is secreted from the lactocytes, fills the alveoli, and is squeezed into the ducts. Clusters of alveoli that drain to a common duct are called lobules; the lactating female has 12–20 lobules organized radially around the nipple. Milk drains from lactiferous ducts into lactiferous sinuses that meet at 4 to 18 perforations in the nipple, called nipple pores. The small bumps of the areola are called Montgomery glands. They secrete oil to cleanse the nipple opening and prevent chapping and cracking of the nipple during breastfeeding.

THE PROCESS OF LACTATION

The pituitary hormone prolactin is essential in the starting and maintaining of breast milk supply. Near the fifth week of pregnancy, there is an increase in the level of circulating prolactin which raises 10–20 times the pre-pregnancy concentration. During pregnancy, prolactin and other hormones prepare the breasts anatomically for the secretion of milk. The level of prolactin stays the same in late pregnancy but is at a level high enough to initiate milk production. However, estrogen, progesterone, and other placental hormones stop prolactin-mediated milk synthesis during pregnancy. It is not until the placenta is expelled that milk production continues.

After childbirth, the baseline prolactin level drops, but it is restored for a 1-hour spike during each feeding to stimulate the production of milk for the next feeding. With each prolactin spike, estrogen and progesterone also increase slightly.

When the infant suckles, sensory nerve fibers in the areola trigger a neuroendocrine reflex that results in milk secretion from lactocytes into the alveoli. The posterior pituitary releases oxytocin, which stimulates myoepithelial cells to squeeze milk from the alveoli so it can drain into the lactiferous ducts, collect in the lactiferous sinuses, and discharge through the nipple pores. It takes less than 1 minute from the time when an infant begins suckling until milk is secreted.

GESTATION PERIOD IN A NORMAL FEMALE

The gestation period is divided into three equal periods or trimesters. During the first two to four weeks of the first trimester, nutrition and waste are handled by the endometrial lining through diffusion. As the trimester progresses, the outer layer of the embryo begins to merge with the endometrium, and the placenta forms. This organ takes over the nutrient and waste requirements of the embryo and fetus, with the mother's blood passing nutrients to the placenta and removing waste from it.
Chemicals from the fetus, such as bilirubin, are processed by the mother's liver for elimination. Some of the mother's immunoglobulin will pass through the placenta to provide passive immunity against some potential infections.
Internal organs and body structures begin to develop during the first trimester. By five weeks, limb buds, eyes, the heart, and liver have been formed. By eight weeks, the body is essentially formed.

The individual is about five centimeters in length and many of the organs, such as the lungs and liver, are not yet functioning. Exposure to any toxins is dangerous during the first trimester because all of the body's organs and structures are still undergoing initial development. Anything that affects that development can have a severe effect on the fetus' survival.

The second trimester fetus has long arms and legs, and is attached to the placenta, which is round and larger than the fetus; the fetus grows to about 30 cm. It becomes active; this is the period where the mother usually feels the first movements. All organs and structures continue to develop.

The placenta takes over the functions of nutrition and waste and the production of estrogen and progesterone from the corpus luteum. The placenta will continue functioning up through the delivery of the baby.
During the third trimester, the fetus grows to 3 to 4 kg and about 50 cm long; this is the period of really fast growth during the pregnancy. Organ development continues to birth (and some systems, such as the nervous system and liver, continue to develop after birth).

The mother will be at her most uncomfortable during this trimester. She may urinate frequently due to pressure on the bladder from the fetus. There may also be intestinal blockage and circulatory problems, especially in her legs. Clots may form in her legs due to pressure from the fetus on returning veins as they enter the abdominal cavity.

PHYSIOLOGY OF PREGNANCY IN A NORMAL WOMAN

During pregnancy there are physiological changes and these include;

Hormonal: The menstrual cycle is the normal change in your ovaries and uterus that make an egg available for fertilization and prepares the uterus for pregnancy. An egg, or ovum emerges from one or other of the ovaries, leaving behind a structure called the corpus luteum. This structure produces large amounts of progesterone and estrogen. If the ovum is fertilized, the corpus luteum remains intact and continues to maintain the hormone levels needed to keep the uterus baby-friendly. The placenta then develops the ability to secrete the necessary hormones itself, and the corpus luteum typically disappears after 3 to 4 months.
The level of human chorionic gonadotropin spikes in early pregnancy and doubles every two days in the first 10 weeks of pregnancy. Its helps prevent any further menstruation, and to prepare the placenta.

Cardiovascular: During pregnancy, cardiac output increases to meet the needs of the developing fetus, and to provide the volume of blood necessary to fill the uteroplacental circulation. As the fetus grows, the uterus begins to crowd the aorta, and certain positions, such as lying on the back, puts excess pressure on these vessels, which can lead to a drop in blood pressure causing dizziness, fainting, and in some cases, even damage to the fetus.
Exercise or activities that change heart rate tend to put a greater demand on your cardiovascular system when you are pregnant than they normally would, and the large changes in cardiac output associated with pregnancy may add additional strain for women with heart conditions.
A common cardiovascular complication of pregnancy is varicose veins. During pregnancy, the growing uterus puts pressure on veins making it harder for the blood to flow back to the heart causing the blood to pool in the veins making them swell.

Renal: the kidneys are responsible for filtering waste products from the blood, and regulating blood pressure and electrolytes. During pregnancy, changes in kidney function approximately follow changes in cardiac function both organs work considerably harder. By around the 20th week, and sometimes as early as the 8th to 10th week of pregnancy, the kidneys filter 30% to 50% more blood than before pregnancy. This leads to greater reabsorption of sodium, and increased elimination of sugars, amino acids, and creatinine in urine. After about the 12th week of pregnancy, progesterone causes the ureters, to dilate and as the uterus expands, it may compress the dilated ureters, obstructing the flow of urine to your bladder, and increasing the chances that you get a urinary tract, or kidney infection during pregnancy.

Respiratory: when the growing uterus starts to take space normally reserved for your lungs (which restricts their expansion during normal breathing), progesterone triggers the lungs to increase the amount of air inhaled with each breath as well as the number of breaths per minute - the respiratory rate. This increases the oxygen supply required to meet the metabolic needs of the fetus, placenta and other organs.

Metabolic: Changes in metabolism during pregnancy alter the distribution of body fat, as well as how food is digested and processed. Metabolic changes can affect the way in which medications are processed.

Body weight: the growth of a developing fetus in a human needs a lot of energy as a result of this more calories are required during pregnancy. After the first three months (trimester) the appetite of a woman generally increases so that she consumes about 300 extra calories a day. Although in the first trimester just a few pounds are gained, it's also normal to gain about a pound per week for the rest of the pregnancy. The breasts to grow around 1 to 2 cup sizes in preparation for breastfeeding.

Gastrointestinal: As the uterus grows, it puts pressure on digestive organs including the colon, gallbladder, liver, and stomach. This can impair their function, and lead to constipation, gallstones, reduced bile transport, as well as a general slowing of the digestive process that is related to lower levels of the hormone gastrin. In addition to this, high progesterone levels during pregnancy slacken the cardiac sphincter making it open more easily. It is also very common to for heartburn to occur due to acid reflux into the esophagus during the third trimester, as the cardiac sphincter cannot withstand the pressure that builds up in the stomach as your uterus grows.

Musculoskeletal: different anatomical and physiological changes happen during pregnancy that strain the muscles and skeleton, particularly the pelvis, and which may lead to lower-back pain, leg cramps, and hip pain. One of the hormones responsible for musculoskeletal changes during pregnancy is relaxin, which softens the ligaments and cartilage tissues to help the body accommodate the growing baby. In addition to relaxin's relaxing effects, the arrangement of the abdominal muscles themselves is particularly well adapted for childbearing. Unlike in men, where they form a six pack, women's abdominal muscles are positioned to allow them to stretch around a baby-bump.

Integumentary: The integumentary system consists of skin, hair and nails, as well as underlying connective tissue that attach the skin to the body and various glands including sweat and oil producing glands, and the mammary glands. As your pregnancy proceeds, the skin stretches to accommodate the growing uterus and breast tissue. The stretching can tear the underlying connective tissue causing red or purple marks to appear on the abdomen, known as stretch marks. Increased estrogen levels during pregnancy increases the production of melanin, causing the ring of colour around the nipples to darken and creates a line of pigment that runs from the

navel to the pubic bone. Patchy discoloration of the face, darkening of any moles and freckles may occur. Other integumentary changes that may occur during pregnancy include accelerated nail growth and excessive hair growth in unusual places, increased perspiration.