

Prenatal Development

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Introduction

Prenatal defined as “before birth” Prenatal stage begins at conception and ends with the birth of the child.

The first step in the development of a human being is that moment of conception, when two single cells, one from a male and the other from a female, join together to form a new cell called a zygote. This event sets in motion powerful genetic forces that will influence the individual over the entire lifespan

Terminologies

Zygote: A fertilized egg, the first two weeks are a period of rapid cell division. Refers to the ovum & sperm combined into one cell. See rapid cell division & implantation to the uterine wall

Embryo: Developing human organism from about 2 weeks after fertilization until the end of the eighth week Most of the major organs are formed during this time.

Fetus : Developing human organism from nine weeks after conception to birth

Teratogens: Substances that cross the placental barrier and prevent the fetus from developing normally includes: radiation, toxic chemicals, viruses, drugs, alcohol, nicotine

Fetal Alcohol Syndrome (FAS): Physical and cognitive abnormalities that appear in children whose mothers consumed large amounts of alcohol while pregnant

Stages of Prenatal Development

A-Germinal Stage: The first stage of prenatal development, beginning at conception and ending at implantation of the zygote in the uterus (approximately the first 2 weeks).
Zygote: The first two weeks are a period of rapid cell division. Refers to the ovum & sperm combined into one cell. See rapid cell division & implantation to the uterine wall

B-Embryo Stage: Developing human organism from about 2 weeks after fertilization until the end of the eighth week. Most of the major organs are formed during this time.

C-Fetus Stage: Developing human organism from nine weeks after conception to birth

Prenatal environmental influences

1. Teratogens : is any environmental agent that causes damage during the prenatal period. The effects of teratogens vary with the organism's age at the time of exposure. Harder to identify than physical damage, and may not show up until later in development.

2. Prescription and Nonprescription Drugs LIKE:

A-Repeated use of aspirin is linked to low birth weight, infant death around the time of birth, poorer motor development, and lower intelligence scores in early childhood.

B-Heavy caffeine intake is associated with prematurity, miscarriage, and newborn. Babies born to users of cocaine, heroin, or methadone are at risk for prematurity, low birth weight, physical defects, breathing problems, and death

3. Smoke: Effects of smoking during pregnancy include low birth weight and increased chances of prematurity, impaired breathing during sleep, miscarriage, and infant death.

5. Alcohol: when women consume large amounts of alcohol during most or all of pregnancy lead to Fetal alcohol syndrome (FAS). Symptoms include mental retardation, slow physical growth, and facial abnormalities.

6. Radiation: Radiation exposure can cause miscarriage, slow physical growth, an underdeveloped brain, and malformations of the skeleton and eyes, mental retardation, abnormal speech, prematurity and low birth weight

7. Maternal Disease: Certain diseases during pregnancy can cause miscarriage and birth defects LIKE: Rubella, Acquired immune deficiency syndrome (AIDS) , Toxoplasmosis (parasitic disease, leads to eye and brain damage).

8. Other Maternal Factors

a- Exercise: regular exercise is related to increased birth weight.

b- Nutrition: Prenatal malnutrition can damage the immune system and the structure of organs. A vital specific nutrient whose importance during pregnancy has become clear is folic acid, a B vitamin

c. Emotional Stress: stress during pregnancy is associated with a higher miscarriage rate, prematurity, low birth weight and physical defects.

d. Rh Blood Incompatibility: The Rh factor is a protein that, when present in the fetus's blood but not in the mother's, can cause the mother to build up antibodies which can return to the fetus's system and destroy red blood cells can result in mental retardation, heart muscle damage, and infant death.

e. Maternal Age: Women who delay having children face a greater risk of infertility, miscarriage, and babies born with chromosomal defects.

f- Poverty: many of the problems that can negatively affect prenatal development are more common among the poor. Poor women are also likely to have their first pregnancy earlier and to have more pregnancies overall, and they are less likely to be immunized against such diseases as rubella. They are also less likely to seek prenatal care

The Importance of Prenatal Health Care

1. Regular prenatal checkups help ensure the health of the mother and fetus.
2. Toxemia is an illness of the last half of pregnancy in which the mother's blood pressure increases. If untreated, it can cause death of the fetus.
3. Health insurance obtains from prenatal care.
- 4-prenatal care very important in prevent many prenatal disorders LIKE: abortion or prematurity
- 5- Many fetus abnormalities can prevent through prenatal care

Problems in Prenatal Development

- Autosomal Disorders L: are caused by genes located on the autosomes e.g. sickle-cell disease
- Sex-Linked Disorders Most sex-linked disorders are caused by recessive genes .The genes that cause sex-linked disorders are found on the X chromosome. A more serious sex-linked recessive disorder is hemophilia
- Chromosomal Errors: Over 50 different chromosomal anomalies have been identified, and most result in miscarriage. When babies do survive, the effects of chromosomal errors tend to be dramatic
The most common is Down syndrome

Approximate Timetable of Prenatal Development

First Trimester

First Month

1-Fertilization, descent of ovum from tube to uterus. Early cell division and formation of embryonic disc from which new organism will develop.

2-Early formation of three layers of cells: (1) the ectoderm, from which sense organs and nervous system will develop (2) the mesoderm, from which circulatory, skeletal and muscular systems will develop (3) the endoderm, from which digestive and some glandular systems will develop.

3-Nervous system begins to arise ,Development of intestinal tract, lungs, liver and kidneys begins. By end of one month,

Second Month

1-Embryo increases in size to about 1½ inches.

2- Bones and muscle begin to round out contours of body.

3-Face and neck develop and begin to give features a human appearance.

4-Sex organs begin to form.

Third Month

1- Sexual differentiation continues, with male sexual organs showing more rapid development and the female remaining more neutral.

2-digestive system shows activity. Stomach cells begin to secrete fluid; liver pours bile into intestine.

3-Kidneys begin functioning,

Second Trimester

Fourth Month

- 1-Lower parts of body show relatively accelerated rate, hands and feet are well-formed.
- 2-Skin appears dark red, owing to coursing of blood showing through thin skin and wrinkles,
- 3-Reflexes become more active as muscular maturation continues.

Fifth Month

- 1-Skin structures begin to attain final form.
- 2-Sweat and sebaceous glands are formed and function. Skin derivatives also appear — hair, nails on fingers and toes.

Sixth Month

- 1-Eyelids which have been fused shut since third month, reopen; eyes are completely formed.
- 2-Taste buds appear on tongue and in mouth

Third Trimester

Seventh Month

Organism capable of independent life from this time on. Cerebral hemispheres cover almost the entire brain.

Eighth and Ninth Month

- 1-During this time, finishing touches are being put on the various organs and functional capacities. Fat is formed rapidly over the entire body,
- 2-Fetal heart rate becomes quite rapid.

3-Digestive organs continue to expel more waste products, leading to the formation of a fetal stool, called the meconium, which is expelled shortly after birth.

Nursing care for prenatal development

Prenatal care is the health care a woman receives during her pregnancy. Major components of prenatal care are identification and early intervention of medical problems, anticipatory guidance, and supportive services.

Appropriate prenatal care includes the following:

- screening for conditions/disease
 - educational literature
 - Information on social services
 - Information on immunizations and future medical care
 - Information on delivery and nursing
- ❖ Early and ongoing risk assessment should be an integral component of prenatal care. All prenatal care providers should be able to identify a full range of medical and psychosocial risks and to identify risk-appropriate care throughout pregnancy. The goals of early and ongoing risk assessment are to prevent or treat conditions associated with morbidity and mortality.
 - ❖ Provides counseling to women's pregnant
 - ❖ Encouraged to provide prenatal education
 - ❖ All pregnant women should be screened at the first prenatal visit about their use of alcohol, tobacco, and other drugs (ATOD) and exposure to secondhand smoke

- ❖ Certain vaccines are considered safe during pregnancy and can help protect pregnant women and their babies against many serious diseases
- ❖ Maintain Nutrition and supplements
- ❖ Reduce/Cessation smoking
- ❖ Reduce/Cessation of alcohol and drugs
- ❖ Exercise recommendations
- ❖ Avoidance of toxic substances and infectious agents in the work or home environment including: (lead/mercury/copper)
- ❖ Avoid exposure to gases (such as carbon monoxide)
- ❖ Avoid passive smoke
- ❖ Avoid disinfecting agents
- ❖ Avoid exposure to radiation
- ❖ Excessive heat/noise/vibration
- ❖ Stress prevention
- ❖ Provide Social support with referral to other agencies/providers as indicated
- ❖ Recognizing the warning signs of preterm labor