

IGNOU MAPC — MPC 002: Lifespan Psychology

Block 1, Unit 1: Prenatal Development & Environmental Factors

Comprehensive IGNOU Exam Study Notes | Prepared by Brijesh Chaturvedi (Slice of Mind)

1. Meaning & Definition of Prenatal Development

The term "prenatal" literally means before birth—referring to the developmental period during pregnancy, starting from conception (fertilization of an ovum by a sperm cell) until the moment of birth. Although it is the shortest developmental phase in human life (~9 calendar months or 280 days), it is structurally and biologically the most critical phase.

2. Beginning of Life & Genetic Foundations

- **Conception & Chromosomes:** Life begins when a male sex cell (sperm) penetrates the outer wall of the female sex cell (ovum). Upon penetration, the sperm releases 23 chromosomes and the ovum releases 23 chromosomes, uniting to form a single-celled zygote with 46 chromosomes (23 pairs).
- **Autosomes vs Sex Chromosomes:** 22 of the 23 pairs are autosomes (possessed equally by males and females). The 23rd pair consists of sex chromosomes:
 - Female: XX chromosomes (receives X from mother, X from father)
 - Male: XY chromosomes (receives X from mother, Y from father)
 - Biological sex is determined at conception by whether the fertilizing sperm carries an X or Y chromosome.
- **Socio-Cultural Implications of Sex:** Sex determination carries profound lifelong developmental significance. Children face cultural expectations regarding gender roles (e.g. boys typed into masculine games, girls into feminine games). Parental attitudes toward gender during early personality formation impact self-esteem and attachment.

3. Key Characteristics of the Prenatal Period

1. **Shortest & Most Critical Period:** Spans ~270 to 280 days (10 lunar months or 9 calendar months).
2. **Genetic Fixation:** Genetic endowment, hereditary traits, and biological sex are permanently fixed at conception.
3. **Explosive Growth:** Proportionally greater physical growth occurs here than in any other period. Body weight increases by approximately 11 million times from single zygote cell to newborn.
4. **Sensitivity to Environmental Hazards:** Uterine conditions (favourable vs unfavourable) foster or impede hereditary potential. Teratogens and maternal psychological stress leave lasting developmental impacts.
5. **Parental Expectations:** Parental and societal attitudes toward the unborn child significantly shape initial emotional climate and bonding.

4. Stages / Periods of Prenatal Development

A. Period of Zygote (0 – 2 Weeks):

- Begins at conception and ends when the blastocyst implants into the uterine wall.
- Undergoes rapid mitosis (cell division) as it travels down the Fallopian tube.

B. Period of Embryo (3 – 8 Weeks):

- Intensive cell differentiation and organogenesis (formation of body organs).
- Critical organ development timeline: Brain (28 days), Heart & Circulatory system (32 days), Stomach, Kidneys & Limbs (4-8 weeks).
- By 8 weeks, the embryo is a miniature human being (~1 inch long) with all basic body structures present.

C. Period of Fetus (9 Weeks – Birth):

- Rapid growth, functional maturation of organ systems, and bone ossification.
- Age of Viability: By ~22 to 26 weeks, the fetus reaches a point where survival outside the womb becomes possible with medical assistance.

5. Environmental Influences & Teratogenic Hazards

- Maternal Diseases: Rubella (German Measles) in early pregnancy causes high risk of blindness, deafness, and cardiac malformations. Maternal diabetes increases risk of congenital anomalies.
- Prescription & Non-Prescription Drugs: Thalidomide causes severe limb phocomelia (stunting/absence of arms or legs). Alcohol causes Fetal Alcohol Syndrome (FAS), microcephaly, and intellectual deficits.
- Therapeutic Radiation: High-dose radiation causes chromosomal mutations, central nervous system damage, or spontaneous abortion.
- Maternal Age: Teenagers (<18 yrs) face risks due to underdeveloped reproductive systems and poor prenatal care. Older mothers (>35 yrs) face increased chromosomal risk (e.g. Down Syndrome) due to aging oocytes.
- Maternal Nutrition: Sole source of nutrients for fetus. Deficiency in proteins, essential fats, or folic acid leads to neural tube defects and low birth weight.
- Maternal Stress: Emotional stress activates autonomic nervous system -> endocrine release of adrenaline/cortisol, crossing placenta and affecting fetal heart rate and growth.
- Rh Incompatibility: Rh-negative mother with Rh-positive fetus creates anti-Rh antibodies that destroy fetal red blood cells in subsequent pregnancies (preventable with RhoGAM).

Exam Note Summary for IGNOU TEE:

For 10-mark questions: Cover Chromosomal Foundations -> 3 Stages of Prenatal Growth -> Specific Teratogenic Hazards (Diseases, Drugs, Stress, Age, Rh Factor).