

Chapter 5: Growth and Development

Conception
through Birth

5.1 Conception through Birth

Conception

5.1.1 Conception

Each month during reproductive life, an ovary releases an ovum. The ovum is captured by the fallopian tube. Conception (fertilization) occurs when a sperm reaches and penetrates the ovum to form a zygote. Sperms and ova are haploid, i.e., each contains half the number of chromosomes in a body cell (23). The zygote is diploid, i.e., it contains the full complement of chromosomes (46 for the human cell).

As the zygote moves to the uterus, it divides repeatedly to form the embryo: a cluster of developing cells that, by one week after conception, attaches (implants) itself into the wall of the uterus. The placenta is the organ that anchors the embryo to the uterus. The umbilical cord connects the embryo to the placenta. Oxygen and nutrients reach the embryo from the mother through the umbilical cord. The cord also moves wastes from the embryo to the mother to be excreted from her body.

A blocked fallopian tube can result in an ectopic pregnancy, i.e., growth of a fertilized egg outside the uterus, e.g., in the fallopian tube; the tube can then rupture leading to life-threatening internal haemorrhage. Occasionally a twin pregnancy occurs. Twins may be identical or fraternal. In the former, a zygote splits in half and each half forms an embryo. Fraternal twins come from different eggs and sperms and thus have different chromosomes.

Prenatal
Development

5.1.2 Prenatal Development

- **The first trimester.** The embryo is recognizable as a human fetus by the end of the second month.
- **The second trimester.** Muscles develop. The fetus begins to move (quickening). The fetus is almost completely developed by the end of this trimester.
- **The third trimester.** By the end of 9 months, or fortieth week, the fetus is ready to be born.

Factors that influence Prenatal Development

5.1.3 Factors that Influence Prenatal Development

- **The mother's health status**, diet, life style and prenatal care are important. Early and regular medical care by an obstetrician is essential. Blood pressure, weight, urine analysis, information about pregnancy, and the position and growth of the baby are among the items checked regularly.
- **Good nutrition** promotes a healthy pregnancy. Adequate amounts of protein, calcium, iron, and vitamins A, B, C, and D are important. Poor nutrition can lead to slower fetal growth, premature delivery and low birth weight with increased risk to the baby. Alcohol and smoking should be discontinued. All drugs should be avoided except those prescribed by the physician. Ingredients of drugs, inhaled cigarette smoke, and alcohol can cross from the mother's bloodstream to the baby's and cause harm.
- **Proper medical care** can detect, prevent and/or treat problems associated with some pregnancies:
 - **Toxemia of pregnancy**: sudden rise of blood pressure, protein in the urine and increased body water (oedema), after the twentieth week.
 - **Birth defects** may result from drugs, poor dietary habits, or an infection, e.g., rubella, during pregnancy or may be genetic.
 - **Genetic counseling** can advise couples with a family history of genetic disease about their chances of producing offspring with birth defects.
 - **Ultrasound and amniocentesis** can detect birth defects. Amniocentesis is the aspiration and analysis of some of the fluid that bathes the fetus in the uterus. It is performed after the sixteenth week after the position of the baby is determined by ultrasound.
 - **Anti-rhesus vaccine** given to a rhesus-negative mother immediately after birth of a rhesus positive baby will prevent damage to the red blood cells of another rhesus positive fetus in the next pregnancy.
 - **Premature babies** weigh less than 2.5 kg at birth. Mothers at risk can wear a monitoring device around the waist to warn them when early signs of labor occur. They can be rushed to hospital and given medication to stop labor so that the baby will have more time to continue to develop.

Birth

5.1.4 Birth

At birth the **baby is pushed out of the uterus by rhythmic uterine contractions** that grow stronger and faster while the cervix dilates. Once delivered, the baby's mouth is suctioned to remove mucus. The baby starts to cry and, once breathing on its own, the umbilical cord is clamped and cut off. The remaining stub will fall off in a few days.

If the baby **cannot pass through the vagina**, e.g., because it is too large or not correctly positioned, a **caesarian section** is performed.

The postpartum period may last several weeks. It is marked by hormonal changes in the mother's body and the secretion of milk from the breast. Breast-fed babies seem to have fewer cases of respiratory illnesses, skin disorders, constipation and diarrhea, and are less likely to gain excess weight in later life.

Infancy
Through
Adulthood

5.1.5 Infancy through Adulthood

Stages of Development

Growth and development occur in fairly predictable stages. Specific skills and experiences are acquired at each stage which prepares the child for dealing with the problems and challenges of the next stage.

Infancy

a- Infancy

Infancy is the period **from birth to one year**. It is characterized by **rapid growth, eruption of teeth, coordination of the muscular and nervous system, with the ability to sit, stand, and reach for objects**. The infants learn about themselves and explore their environment, especially when they begin to crawl.

Childhood

b- Childhood

Childhood is the period between **the end of infancy and the beginning of puberty**. It is characterized by **steady physical growth**, bowel and bladder control and refinement of communicative skills of writing and speaking. **Exposure to caring and loving people is important** to foster a sense of acceptance, worth, and self-esteem.

Self-esteem is developed as abilities are acquired. Many children appreciate having responsibilities which show that they can care for themselves and others within the family, e.g., putting away their toys, making up their beds, setting or clearing the table when they are able. Decision making also develops during childhood. Children learn to decide for themselves, e.g., what will I wear today? Decisions are not always responsible and parental guidance is needed. Feelings of competence are acquired through the ability to do work and to read which makes children begin to understand a few of the complexities of the world.

Adolescence

c- Adolescence

Adolescence is the **period between infancy and adulthood**, generally between the ages of **12 to 19**. It is characterized by a growth spurt – **earlier in females (11-13 years)** than in **males (13-15 years)** – and appearance of secondary sex characteristics. Questions are raised such as **“who am I?”, “what do I want to be?”, and what do I believe?”** More independence from parents is sought and the influence of a peer group can be significant. Most adolescents,

however, will agree with their parents' ideas and share their values. Parents can contribute to a healthy adolescence by 1) allowing children to develop independently, feel secure and practice self-discipline early in life, and 2) maintaining contact with their children by developing an interest in their activities and demonstrating trust and approval.

Adulthood

d- Adulthood

Adulthood is the period from adolescence through old age. Adults do not change much physically over the years, and they can stay fit into old age if they exercise regularly and adopt healthful lifestyles. Psychosocial changes, however, occur:

- **Early adulthood** (third decade), is characterized by independence, and self-responsibility. Intimate relations are sought.
- **Middle adulthood** (fourth decade) is marked by adjusting life goals and seeking standards, e.g., quitting an unsatisfactory job and looking for a new one.
- **Late adulthood** is often the most stable period of the life cycle with people looking back with satisfaction at what they have accomplished. However, it could be a depressing time for people who have not achieved a sense of closeness with others and who feel they have no control over their destiny.

Completion of
the Life Cycle

5.2 Completion of the Life Cycle

Introduction



5.2.1 Introduction

Throughout the life cycle, **from birth till death**, people undergo **many physical, mental and social changes**. Coping with these changes in healthful ways helps insure optimum health in old age.

What Causes
Aging?

5.2.2 What Causes Aging?

Biologically, a person begins to age **after physical maturity, around age 25**, when cells die faster than they reproduce. Being old, however, is a state of mind, and not a specific period of life (you might still be young at age 75 if you keep up to date with current events and stay fit).

There are **many theories** about why people ages, e.g., wear-and-tear, waste product accumulation, accumulation of genetic errors as cells copy their genetic material during cell replication....

Physical
Aspects of
Aging

5.2.3 Physical Aspects of Aging

External signs of aging, such as **wrinkled skin and baldness**, may appear as early as the fourth decade in some people and not until **the sixth or seventh decade in others**.

Internal signs result from **less efficient functioning of body systems**. Sense organs become less sensitive. The ability of the heart to pump blood and of the lung to oxygenate it is reduced, so is the capacity of the digestive and excretory systems to process nutrients and excrete waste products.

Some chronic diseases are more prevalent in old age, e.g., **heart disease, hypertension, cancer, and arthritis**. Correctable risk behaviors, rather than the aging process, are often responsible. Choosing health-promoting behaviors when young helps insure good health when old.

Mental
Aspects of
Aging

5.2.4 Mental Aspects of Aging

Most people over age 65 are mentally fit and can take care of themselves. A few suffer from **dementia**. Dementia produces loss of memory and deterioration of other mental functions (e.g., inability to handle simple math problems and loss of the concept of time and space), and, sometimes, personality changes and confusion.

Alzheimer's disease is the commonest cause of dementia. It is more common in women.

Multiple infarct dementias is due to multiple small strokes (ruptures blood vessels in the brain). It is more common in men.

Reversible (correctable) causes of dementia include 1) drugs (due to the combined side effects of the multiple drugs often taken by the elderly, or to improper doses), 2) medical illness (e.g., vitamin and nutritional deficiency, thyroid disease...).

Depression in the elderly often presents as dementia. Treating the depression reverses the dementia.

Social
Aspects of
Aging

5.2.5 Social Aspects of Aging

Elderly people may face some social problems. **Ageism** is the discrimination against a person based on age. **Stereotyping** is the assumption that people in a particular group will think or behave in a certain way. It is socially harmful because it ignores individual differences. Common stereotypes about older people include intellectual failure (false. Intelligent people probably remain intelligent until they die), and retirement causes people to die early (false. Retirement does not cause ill health or premature death). **Loneliness** is another social concern of elderly people when their ageing friends or spouses die. **Social isolation** of older people can be avoided by spending some time with them and encouraging them to seek new friends and participate in new activities.

Planning for
Good Health
in Old Age

5.2.6 Planning for Good Health in Old Age

Healthful behaviors that promote good health in the future include:

- **Be active physically and mentally**, e.g., engage in a program of exercise and become involved in cultural and social events of your choosing.
- **Take time to relax from work**. This is one way to handle stress.
- **Eat healthful foods and refrain from smoking**.
- **Learn new skills**, e.g., music, to increase one's interest in life.