MIDWIFERY

Anatomy and Physiology of Male and Female Reproductive Systems

In-depth Study Notes for Loksewa- ANM & SN

Chapter 5.1: Anatomy and Physiology of Male and Female Reproductive Systems

---

INTRODUCTION

Midwifery practice requires a comprehensive understanding of the anatomy and physiology of the male and female reproductive systems. This knowledge forms the foundation for understanding conception, pregnancy, labor, birth, and postpartum care. This chapter provides a detailed, pointwise explanation of both systems, focusing on their structures, functions, and roles in reproduction.

A. FEMALE REPRODUCTIVE SYSTEM

1. Anatomy of the Female Reproductive System

External Genital Organs (Vulva)

1. **Mons Pubis**: Fatty tissue over the pubic bone; protects underlying structures.
2. **Labia Majora**: Outer skin folds; protect inner structures.
3. **Labia Minora**: Inner skin folds; enclose the vestibule.
4. **Clitoris**: Erectile tissue rich in nerve endings; involved in sexual arousal.
5. **Vestibule**: Area enclosed by labia minora; contains openings of the urethra, vagina, and Bartholin's glands.
6. **Bartholin's Glands**: Secrete mucus for lubrication during intercourse.

Internal Genital Organs

1. **Vagina**:
    - Muscular canal; 7–10 cm long
    - Serves as the passage for menstrual flow, sexual intercourse, and childbirth

2. **Uterus**:
    - Pear-shaped muscular organ
    - Divided into fundus, body, isthmus, and cervix
    - Lined by endometrium, important for implantation and menstruation
3. **Fallopian Tubes (Oviducts)**:
    - 10–12 cm long
    - Transport ova from ovary to uterus
    - Site of fertilization
4. **Ovaries**:
    - Almond-shaped glands
    - Produce ova (eggs) and secrete hormones (estrogen and progesterone)

2. Physiology of the Female Reproductive System

Menstrual Cycle

1. **Average Length**: 28 days (varies from 21–35 days)
2. **Phases**:
    - **Menstrual Phase** (Days 1–5): Shedding of endometrial lining
    - **Follicular Phase** (Days 1–13): Follicle develops, estrogen rises
    - **Ovulation** (Day 14): Release of mature ovum
    - **Luteal Phase** (Days 15–28): Corpus luteum forms, progesterone dominates

Hormonal Regulation

1. **Hypothalamus**: Releases GnRH
2. **Pituitary Gland**:
    - Releases FSH (stimulates follicle development)
    - Releases LH (triggers ovulation)
3. **Ovaries**:
    - Produce estrogen (builds endometrium)
    - Produce progesterone (maintains endometrium)

Fertilization and Implantation

1. **Fertilization**: Takes place in the ampulla of the fallopian tube
2. **Implantation**: Blastocyst embeds in the endometrium (usually 6–10 days post-fertilization)

Pregnancy Hormones

1. **hCG**: Maintains corpus luteum during early pregnancy
2. **Estrogen and Progesterone**: Support endometrium and fetal development
3. **Relaxin**: Relaxes ligaments during labor
4. **Oxytocin**: Stimulates uterine contractions and milk ejection

B. MALE REPRODUCTIVE SYSTEM

1. Anatomy of the Male Reproductive System

External Organs

1. **Penis**:
   - Organ for urination and copulation
   - Contains erectile tissue (corpora cavernosa and corpus spongiosum)
2. **Scrotum**:
   - Sac holding testes
   - Maintains optimal temperature for spermatogenesis

Internal Organs

1. **Testes**:
   - Paired glands
   - Produce sperm and testosterone
2. **Epididymis**:
   - Coiled tube for sperm maturation and storage
3. **Vas Deferens**:
   - Transports sperm to the ejaculatory duct
4. **Seminal Vesicles**:
   - Secrete seminal fluid rich in fructose
5. **Prostate Gland**:
   - Secretes alkaline fluid
   - Enhances sperm motility
6. **Bulbourethral (Cowper's) Glands**:
   - Secrete mucus-like fluid for lubrication

2. Physiology of the Male Reproductive System

Spermatogenesis

1. Takes place in seminiferous tubules of testes
2. Begins at puberty, continues throughout life
3. Involves mitosis, meiosis, and transformation into mature sperm
4. Takes around 64 days

Hormonal Control

1. **Hypothalamus**: Secretes GnRH
2. **Pituitary Gland**:
   - FSH stimulates spermatogenesis
   - LH stimulates testosterone production
3. **Testosterone**:

- Stimulates development of male secondary sex characteristics
- Maintains libido, supports spermatogenesis

Ejaculation and Semen Composition

1. **Ejaculation**: Involuntary reflex expelling semen
2. **Semen**: Composed of sperm + seminal vesicle fluid + prostate secretion + Cowper's fluid
3. Average volume: 2–6 ml per ejaculation
4. Sperm count: 15–200 million/ml (WHO standard)

Tables for Clarity

Table 1: Comparison of Male and Female Reproductive Systems

Feature	Male	Female
Gamete	Sperm	Ovum
Site of gamete production	Testes	Ovaries
Hormones	Testosterone	Estrogen, Progesterone
External Genitalia	Penis, Scrotum	Vulva (Labia, Clitoris, etc.)
Internal Organs	Vas deferens, Prostate, etc.	Uterus, Fallopian tubes, etc.

Table 2: Hormones and Functions

Hormone	Source	Function
GnRH	Hypothalamus	Stimulates release of FSH and LH
FSH	Pituitary	Stimulates follicle/sperm development
LH	Pituitary	Triggers ovulation/testosterone secretion
Estrogen	Ovaries	Develops endometrium, secondary sex traits
Progesterone	Corpus luteum	Maintains endometrium
Testosterone	Testes	Male traits, libido, spermatogenesis

Multiple Choice Questions (MCQs)

1. What is the primary site of fertilization? a) Uterus
   b) Cervix
   c) Ampulla of the fallopian tube
   d) Vagina
   Answer: c) Ampulla of the fallopian tube
2. Which hormone is responsible for maintaining the endometrium after ovulation? a) Estrogen
   b) Progesterone

c) LH
d) FSH
Answer: b) Progesterone

3. Sperm maturation takes place in the: a) Testes
   b) Vas deferens
   c) Epididymis
   d) Prostate gland
   Answer: c) Epididymis
4. The female external genitalia collectively is called: a) Uterus
   b) Vulva
   c) Vagina
   d) Ovary
   Answer: b) Vulva
5. What is the role of the prostate gland? a) Sperm storage
   b) Produce testosterone
   c) Secrete alkaline fluid
   d) Fertilize ovum
   Answer: c) Secrete alkaline fluid