CONTENTS

1. Anatomy and Physiology 1

- Homeostasis 1
- Cell and Cell Structure 1
- Tissue 3
- Glands 6
- Blood 6
- Immunity 8
- Central Nervous System 8
- Structures of the Brain 9
- The Autonomic Nervous System 9
- Cardiovascular System 9
- Blood Circulation through Heart 10
- Endocrine System 11
- Respiratory System 13
- Digestive System 14
- Physiology of Digestion 15
- Urinary System 17
- Physiology of Urine Formation 18
- Facts About Human Anatomy 19
- **Multiple Choice Questions 19**

2. Fundamentals of Nursing 41

- Medical Invention and Discoveries 41
- Nursing as a Profession 41
- Hospital Admission and Discharge 43
- Nursing Process 43
- Records and Reports 44
- Communication and Nurse-Patient Relationship 44
- Vital Sign 45
- Pulse 46
- Comfort Devices 49
- Positioning 49
- Oxygen Therapy 54
- Pressure Ulcer 57
- Medication Administration 59
- Infection Control Practices 61
- Personal Protective Equipment 62
- **Multiple Choice Questions 66**

3. Medical Surgical Nursing 106

- Fluid-Electrolyte Balance 106
- Electrolyte Imbalance 106
- Respiratory System 108
- Gastrointestinal System 111
- Cardiovascular System 114
- Valvular Heart Disease 115
- Arrhythmia 116
- Disorders of Central Nervous System 118
- Disorder of the Eye 122
- Instrument and Equipment 126
- **Multiple Choice Questions 131**

4. Community Health Nursing 187

- Health and its Dimensions 187
- Indicators of Health 188
- Primary Health Care 188
- Health for All 189
- Concept of Community 189
- Family Health Nursing Process 190
- Home Visit 191
- National Health Policy 191
- Health Services Organization at Different Levels 192
- National Health Program 193
- Immunization 193
- Disaster Management 195
- Occupational Health and Safety 197
- **Multiple Choice Questions 199**

5. Obstetric and Gynecological Nursing 248

- Female Pelvis 248
- The Fetal Skull 249
- Physiology of the Female Reproductive Organs 252
- The Breast Anatomy 252
- Normal Pregnancy 254
- The Fetal Circulation 255
- The Placental Circulation 256
- Physiological Changes in Pregnancy 257
- Diagnosis of Pregnancy 258
- Model Maternal and Child Health Services 259
- Preconception Care 259
- Antenatal Care 259
- Managing the Minor Disorders of Pregnancy 263
- Normal Labor 264
- Physiology of Normal Labor 264
- Mechanism of Normal Labor 265
- Ectopic Pregnancy 266
- Tubal Pregnancy 266
- Preeclampsia 267
- Abortion 268
- Postpartum Hemorrhage 269
- General Practice 269
- Antepartum Hemorrhage 270
- Placenta Previa 270
- Abruptio Placentae 270
- **Multiple Choice Questions 272**

6. Pediatrics Nursing 319

- Growth and Development 319
- Aspects of Growth and Development 319
- Growth Monitoring 320
- Development 321
- Congenital Disorders of Gastrointestinal Tract 321
- Cleft Lip 324
- Cleft Palate 324
- Pyloric Stenosis 325
- Gastroschisis and Omphalocele 325
- Intestinal Obstruction 326
- Intussusception 326
- Congenital Heart Disease 326
- Arterial Septal Defect 327

- Ventricular Septal Defect 327
- Patent Ductus Arteriosus 327
- Tetralogy of Fallot 327
- Congenital Malformation of Central Nervous System 328
- Brain Defects 329
- **Multiple Choice Questions 330**

7. Psychiatric Nursing 369

- Mental Illness 369
- Organic Mental Disorder 369
- Alcohol Abuse 370
- Anxiety Disorders 370
- Phobic Disorder 371
- Obsessive-Compulsive Disorder 372
- Schizophrenia 372
- Somatoform Disorder 372
- Mood Disorders 373
- Family Therapy 374
- Psychotherapy 375
- Electroconvulsive Therapy 375
- Milieu Therapy or the Therapeutic Community 377
- Group Therapy 378
- Aromatherapy 379
- Cognitive Therapy 379
- Recreational Therapy 380
- Occupational Therapy 380
- Mental Health Rehabilitation 381
- Psychopharmacology 382
- Neurological Tools 383
- Terminology 384
- **Multiple Choice Questions 387**

8. Nutrition and Biochemistry 416

- Concept of Food and Nutrition 416
- Classification of Nutrients 416
- Proteins 416
- Carbohydrates 418
- Lipids or Fats 419
- Vitamins 420
- **Multiple Choice Questions 423**

9. Nursing Education 436

- Concept of Education 436
- Aims of Education 436
- Nature of Education 436
- Functions of Education 437
- Educational Objectives 437
- Philosophy of Education 439
- Maxims of Teaching 441
- Guidance and Counseling 441
- Concept of Counseling 441
- Audiovisual Aids 443
- Concept of Educational Evaluation 443
- Assessment Methods 444
- Introduction to Concept of Curriculum 444
- **Multiple Choice Questions 446**

10. Nursing Research 463

- Introduction to Research 463
- Research Process 463
- Research Problem Concept 464
- Research Objectives 465
- Research Hypothesis 465
- Literature Review 466
- Theoretical Framework 466
- Sampling and Sampling Design 467
- Data Collection 468
- Data Analysis and Interpretation 468
- Communication and Utilization of Research 470
- **Multiple Choice Questions 470**

11. Nursing Administration 487

- Concept of Management and Nursing Management 487
- Concept of Administration and Nursing Administration 487
- Mission Statements 488
- Vision Statement 488
- Philosophies of Nursing Management 488
- Functions of Administration and Management 489
- **Multiple Choice Questions 498**

12. Pharmacology 505

- Terminologies Used in Pharmacology 505
- Adverse Drug Reaction 505
- Antihypertensive 505
- Aldosterone Receptor Antagonists 506
- Cholinergic Drugs (Cholinomimetic, Parasympathomimetic) 509
- Anticholinergic Drugs 510
- Antibiotic Classification 510
- Serotonergic (5-Ht) Receptors 511
- **Multiple Choice Questions 511**

13. Sociology 517

- Common Terms Used in Sociology 517
- Society 518
- Social Stratification 519
- Social Deviance 521
- Marriage 522
- Definition of Family 524
- Culture 525
- **Multiple Choice Questions 527**

14. Microbiology 538

- Invention and Discoveries in the Field of Microbiology 538
- Terminologies 538
- Cell Structure and Organization 538
- Bacterial Growth, Nutrition, Metabolism 539
- Types of Vaccines 540
- Routine Laboratory Media 541
- Common Media in Routine Use 541
- **Multiple Choice Questions 542**

15. Computer 550

- Concept of Informatics and Nursing Informatics 550
- Goal of Nursing Informatics 550
- Bases of Nursing Informatics 550
- Fundamentals of Computer 551
- Competency in Nursing Informatics 552
- Applications of Computers 553
- Electronic Medical Record 555
- The Electronic Health Record 555
- **Multiple Choice Questions 557**

16. English 563

- Sentence 563
- Parts of Speech 563
- **Multiple Choice Questions 570**

17. General Knowledge 575

- Basic Information about India 575
- National Symbols of India 575
- States and Capitals of India 575
- Capital and Currency of Countries 576
- Office Holders in the Government of India 577
- Latest Brand Ambassador List 577
- Brand Ambassador List of Government Schemes 578
- World's Biggest, Highest, Tallest, and Largest Things 578
- Famous Dialogue 578
- Indian Geography 578
- Major Rivers and Dams 579
- Major Thermal Power Plants and Nuclear Power Plants in India 579
- **Multiple Choice Questions 579**

18. Common Nursing Procedures 590

- Oral Care 590
- Bed Bath 590
- Medication Administration 591
- Administration of Medication through Parenteral Route 593
- Wound Dressing 594
- Oxygen Administration 595
- Nebulization Therapy 596
- Steam Inhalations 597
- Endotracheal Tube Suctioning 598
- Principles of Suctioning 598
- Chest Tube Insertion 599
- Thoracocentesis/Thoracentesis 600
- ECG Monitoring 600
- Tube Feeding/Gastric Gavage 601
- Bone Marrow Aspiration 602
- Blood Transfusion 603
- Electroconvulsive Therapy 605
- Urine Test for Glucose 605
- Urine Test for Albumin 606
- Blood Test for Hemoglobin 606
- Normal Delivery and Active Management of Third Stage of Labor 607
- Birth of Baby 608
- Active Management of Third Stage of Labor 608
- Preparation for Episiotomy 609
- Essential Newborn Care 610
- Newborn Resuscitation 610
- Collection of Pap Smear 611
- IUCD Insertion (Interval) 612
- Removal of the Copper T 380A IUCD 613
- Perineal Care 614
- Kangaroo Mother Care 614
- Care of the Newborn in Incubator 615

Previous Year Question Papers 617

- AIIMS Mangalagiri Tutor/Clinical Instructor – 2022 619
- AIIMS Mangalagiri (Assistant Professor) – 2022 624
- AIIMS Raipur—Lecturer in Nursing – 2022 629
- NORCET – 2020 634
- AIIMS Patna (Nursing Officer) – 2020 643
- AIIMS Nagpur (Nursing Officer) – 2020 651
- AIIMS Nagpur Nursing Officer (Staff Nurse Grade II) – 2020 656
- AIIMS Delhi Nursing Officer Recruitment Entrance Exam – 2019 660
- AIIMS Raipur Nursing Officer (Staff Nurse Grade II, Set 1) – 2019 673
- AIIMS Raipur Nursing Officer (Grade II, Set 2) – 2019 677
- AIIMS Raipur Nursing Officer Staff Nurse (Grade II, Set 3) – 2019 681
- NIMHANS (Nursing Officer) – 2019 685
- Nursing Tutor, Sail Rourkela – 2019 688
- SAIL: RSP Sister Tutor – 2019 692
- AIIMS Mangalgiri Staff Nurse (Grade II) – 2018 696
- AIIMS Raipur (Nursing Officer, Set 1) – 2017 700
- AIIMS Raipur (Nursing Officer, Set 2) – 2017 706
- AIIMS Raipur (Nursing Officer Grade II, Set 3) – 2017 711
- AIIMS Jodhpur and Rishikesh Nursing Officer's Combined Paper – 2017 715
- RAK College of Nursing (MSc Nursing Entrance) – 2017 723
- RUHS (MSc Nursing Examination) – 2017 729
- Uttaranchal State Govt College of Nursing (Haldwani) – 2015 732
- RRB Paramedical Public Health Nurse – 2015 738
- PGIMER (Staff Nurse Examination) – 2015 742
- Dr Nandhamuri Tharaka Ramarao University of Health Sciences Vijayawada, Andhra Pradesh (MSc Nursing Entrance Examination) – 2014 746

Index *751*

2

CHAPTER

Fundamentals of Nursing

MEDICAL INVENTION AND DISCOVERIES

- 1849—Elizabeth Blackwell is the first woman to gain a medical degree in the United States
- 1870—Louis Pasteur and Robert Koch establish the germ theory of disease
- 1879—First vaccine for cholera
- 1881—Louis Pasteur develops an anthrax vaccine
- 1882—Louis Pasteur develops a rabies vaccine
- 1846—First painless surgery with general anesthetic
- 1816—Rene Laennec invents the stethoscope
- 1800—Humphry Davy announces the anesthetic properties of nitrous oxide
- 1796—Edward Jenner develops a smallpox vaccination method
- 1903—Willem Einthoven invents electrocardiography
- 1921—Frederick Banting and Charles Best discover insulin – important for the treatment of diabetes
- 1953—Heart-lung machine – John Heysham Gibbon
- 1952—Jonas Salk develops the first polio vaccine
- 1962—Hip replacement – John Charnley
- 1971—Magnetic resonance imaging – Raymond Vahan Damadian
- 1982—Human insulin – Eli Lilly
- 1674—Bacteria: Anton van Leeuwenhoek
- 1628—Blood Circulation: William Harvey
- 1818 – Blood Transfusion: Dr. Thomas Blundell
- 1887—Contact Lenses: Adolf Fick
- 1953—DNA: Frances Crick, James Watson and Rosalind Franklin
- 1865—Genetics: Johann Gregor Mendel
- 1590—Compound microscope: Hans Janssen
- 1928—Penicillin: Alexander Fleming
- 1866—Medical thermometer: Thomas Allbutt
- 1885—Rabies vaccine: Louis Pasteur
- 1753—Scurvy vaccine: James Lind
- Karl Landsteiner (1868–1943)—discovered/distinguished main blood groups in 1900
- Anton van Leeuwenhoek (1632–1723)—Bacteria (discovered) in 1674
- Dr Joseph Murray and Dr David Hume in Boston (1954) – Organ Transplant

NURSING AS A PROFESSION

Definition of Nursing

Nursing is the unique function of the nurse, i.e., to assist the individual, sick or well, in the performance of those activities contributing to health or recovery or to a peaceful death that he or she would perform unaided if he/she had the necessary strength will or knowledge, and to do so in such a way as to help him/her to gain independence as rapidly as possible.

—Virginia Henderson

Objectives

- Promoting health
- Preventing illness
- Restoring health
- Facilitating coping with death and disability

Nature of Nursing Practice

- Nursing is caring
- Nursing is science and art
- Nursing is holistic
- Nursing is adaptive
- Nursing is patient-centered

Scopes of Nursing Practice

- Bedside nurse
- Public health nurse
- Occupational health nurse
- School health nurse
- Military nursing
- Infection control nurse
- Nurse educator
- Clinical nurse specialist
- Independent nurse practitioner

Functions of a Nurse

Caregiver, Counselor, Clinical and ethical decision-maker, Protector and advocate, Change agent, Case manager, Rehabilitator, Comforter, Communicator, Teacher, Leader, Researcher

JAYPEE BROTHERS

Criteria of Nursing Profession (Kelly 1981)

- The service provided is vital to humanity and the welfare of society.
- There is a special body of knowledge that continually enlarges through research.
- Intellectual activities and individual responsibilities (accountability) as strong feature.
- Educated in institute of higher learning
- Practitioners are relatively independent (autonomy) and control their own policies and activities.
- Motivated by altruism and consider the work an important component of their lives
- There is a code of ethics to guide decision and conduct of practitioner.
- There is an organization (association) that encourages and supports high standards of practice.

Code of Ethics for Nurses

Ethics are the distinction between right and wrong based on body of knowledge not based on opinion.

Ethical Principles

- Respect and autonomy
- Beneficence
- Justice
- Veracity
- Fidelity
- Accountability
- Confidentiality

Elements of ICN Code of Ethics

- Nurse and people
- Nurse and practice
- Nurse and coworker
- Nurse society
- Nurse and profession

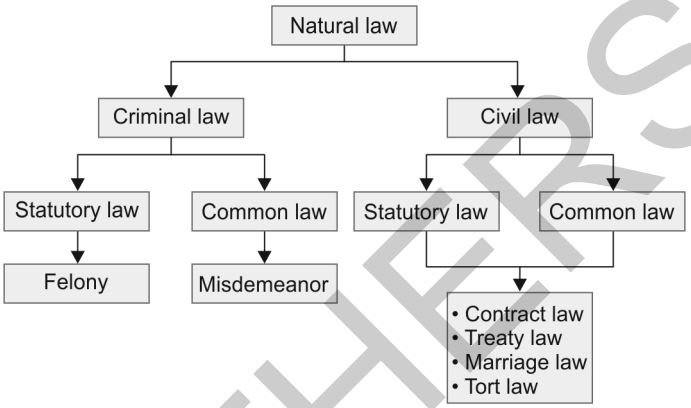
Indian Nursing Council's Code of Ethics

- Nurse respects the uniqueness of the individual in the provision of care.
- The nurse respects the rights of individuals as partner in care and help in making informed choices.
- The nurse respects an individual's right to privacy, maintains confidentiality, and shares information judiciously.
- The nurse maintains competence to render Quality Nursing Care.
- The nurse is obliged to practice within the framework of ethical, professional, and legal boundaries.
- The nurse is obliged to work harmoniously with members of the health team.
- Nurse commits to reciprocate the trust invested in nursing profession by society.

Legal Aspects in Nursing

See **Flowchart 2.**1.

Flowchart 2.1: Legal aspects in nursing.



Legal Terminologies

- Administrative law—laws that govern government agencies, such as the Department of Education and the Equal Employment Opportunity Commission
- Constitutional laws are laws that protect citizens' rights as afforded in the Constitution
- Criminal laws are laws that relate to crime
- Municipal laws are ordinances, regulations, and by-laws that govern a city or town.
- International laws are laws that oversee relations between nations.
- Contract law—governs the rights and obligations of those entering into contracts.
- Tort law—rights, obligations, and remedies provided to someone who has been wronged by another individual
- Property law—governs forms of property ownership, transfer, and tenant issues
- Succession law—governs the transfer of an estate between parties
- Family law—governs family-related and domestic issues
- Laws—rules of conduct enforced by the government
- Torts—when others interfere in an individual's privacy
- Assault—an attempt or threat to touch another person unjustifiable.

For example, threatening a client with injection after the client refuses to take the medication orally.

- Battery: Willful touching of a person that may or may not cause harm. Can include touching the person's clothes or even something the person is carrying (without permission, that is embarrassing). For example, giving injection to a patient without consent.
- Liability—an obligation to pay money to another party
- Litigation—a lawsuit, or legal
- Crime: An act committed in violation of public law and that is punishable by a fine or imprisonment. The act does not have to be intended.
- Negligence: Misconduct or practice that is below the standard expected from an ordinary, reasonable, and prudent person. Such conduct places another person at risk for harm.

JAYPEE BROTHERS

- Malpractice: Failure to meet the standard of acceptable care which results in harm to another person.
- Defamation: Communication that is false or made with a careless disregard for the truth, and results in injury to the reputation of a person. Only the person defamed may bring the lawsuit.
- Libel: Defamation by means of print, writing, or pictures, i.e., writing in the nurse's notes that a physician is incompetent because he did not respond immediately to a call
- Slander: Defamation by the spoken word, stating unprivileged (not legally protected) or false words by which a reputation is damaged, i.e., a nurse telling a client that another nurse is incompetent
- Whistle-Blowing—the disclosure by an employee of illegal, immoral, or illegitimate practices by the organization
- Consent—permission given by a patient
- Competent—one who is legally fit (both mentally and emotionally)
- Release—legal form used to excuse one from liability
- Power of Attorney—a legal instrument authorizing someone to act as the grantor's agent.

HOSPITAL ADMISSION AND DISCHARGE

Every patient being admitted is nervous, even if it is not their first admission.

Nurse's Responsibility during Admission

- Prepare patient's room and arrange articles for physical assessment.
- Receive the patient and check admission details.
- Greet the patient in a friendly and cheerful manner, and introduce yourself.
- Check height and weight.
- Make sure there is adequate light and ventilation in the room and it is properly cleaned.
- Inform the patient/relatives about visiting hours, hospital rules, the timing of hot water availability, mealtime, telephone use, drinking water, and the location of the pharmacy.
- Get the general consent signed after explaining the purpose of this consent.
- Perform initial assessment of the patient, collect history and record any unusual findings.
- Record the receiving date, time, and referred department including the nursing activities.
- In case of MLC, patient details need to be intimated to the nearest police station by a competent authority.

Nurse's Responsibility during Discharge

- The patient's discharge process should be planned in consultation with the patient and/or family.
- A discharge summary is to be given to all the patients during discharge or leave against medical advice (LAMA).
- Discharge summary needs to be clear and legible with language understandable by the patient without any abbreviation and medication should be written in capital letters.
- Provide wheelchair/stretcher if needed to transport the patient.
- Inform police before discharge in case of MLC case.

NURSING PROCESS

It is a systematic problem-solving approach used to identify, prevent, and treat actual or potential health problems and promote wellness.

Steps of Nursing Process (Fig. 2.1)

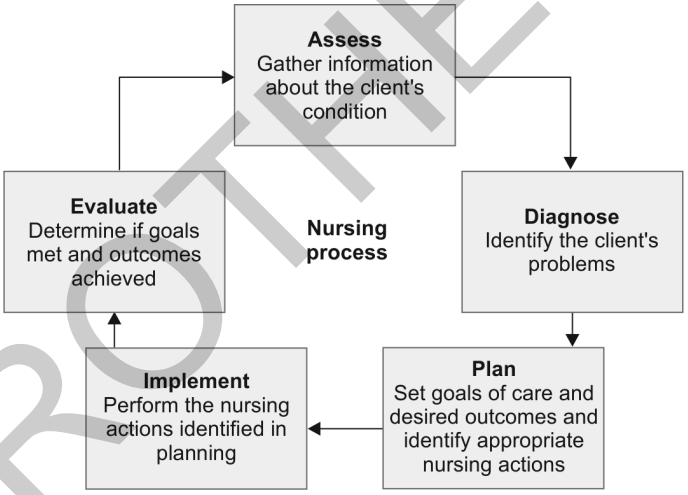


Fig 2.1: Steps of nursing process.

Nursing Assessment

It is a systematic and continuous collection, validation, and communication of client data regarding:

- Health problem
- Related experience
- Health practices
- Values and lifestyle

Types of Assessment

- **Initial assessment:** It is performed shortly after patient admission to a health agency or hospital.
- **Focused assessment:** The nurse gathers data about a specific problem that has already been identified.
- **Emergency assessment**: This assessment is done to compare a patient's current status to the baseline data obtained earlier to evaluate change in functional status.
- **Time-lapsed assessment**: This assessment is done to compare a patient's current status to the baseline data obtained earlier to evaluate change in functional status.

Types of Data

Objective data—observable and measurable facts **(Signs)**, e.g., diaphoresis, icterus, pallor, BP: 110/70 mm Hg

Subjective data—information that only the client feels and can describe **(Symptoms),** e.g., pain, dizziness, head reeling

JAYPEE BROTHERS

Nursing Diagnosis

"A clinical **judgment** about individual, family or community responses to **actual or potential health problems/life processes.**"

It is composed of three parts:

- Problem statement—the client's response to a problem
- Etiology—what is causing/contributing to the client's problem
- Defining Characteristics—what is the evidence of the problem.

Types of Nursing Diagnosis

1. **Actual diagnosis:** Problem present at the time of the assessment and the presence of associated signs and symptoms
2. **Risk diagnosis**: Problem does not exist but presence of risk factors.
3. **Wellness diagnosis**: This describes human responses to levels of wellness in an individual, family, or community that have a readiness enhancement, e.g., readiness for enhancement.
4. **Possible diagnosis**: Evidence about a health problem is unclear. Requires more data to either support or refute it. For example, possible social isolation.
5. **Syndrome diagnosis**: Associated with a cluster of other diagnoses, e.g., risk for disuse syndrome.

Planning

Expected outcomes are identified and interventions are selected to aid the client reach these goals.

Types:

- Initial planning
- Ongoing planning
- Discharge planning

Interventions

Independent (Nurse-initiated)—any action the nurse can initiate without direct supervision (sponging for fever)

Dependent (Physician-initiated)—nursing actions requiring MD/physicians orders (giving antipyretics)

Collaborative—nursing actions performed jointly with other healthcare team members (managing a case of cardiac arrest).

Evaluation

Determining whether the client's goals have been met, partially met, or not met.

RECORDS AND REPORTS

Record is the permanent written communication that documents information relevant to the client's healthcare management.

Report is a summary of activities or observations seen or performed.

Principles of Maintaining Records

Factual, accurate, complete, timely, concise, legible.

Types of Records (Fig. 2.2)

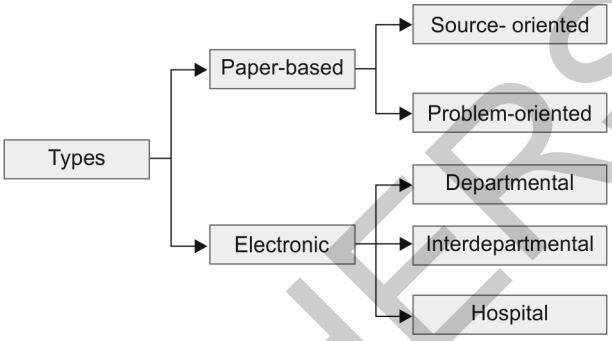


Fig. 2.2: Types of record.

COMMUNICATION AND NURSE-PATIENT RELATIONSHIP

Communication refers to the sharing of ideas, facts, opinions, information, and understanding **(Fig. 2.3).**

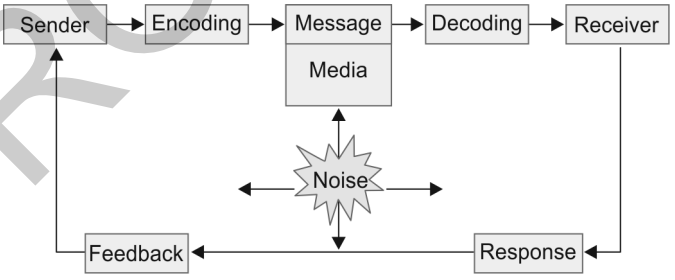


Fig. 2.3: Elements of communication process.

Principles of Communication

- Know your audience
- Knowledge about the purpose of communication
- Present information in several ways
- Be clear and concise
- Understanding
- Consistency
- Completeness
- Time: Should reach in time

Elements of Communication

- **Referent:** It motivates one person to communicate with another, e.g., odor, sound, sight, sensation, perception, etc.
- **Sender:** The person who encodes and delivers the message
- **Encoding:** Encoding means the process of putting thought into symbolic form which can be understood by another person to whom the sender wants to communicate the idea.
- **Message:** It is the content of communication. It can be verbal, nonverbal, symbolic, etc.
- **Channels**: Means of conveying and receiving message through visual (facial expression), tactile (touch) and auditory senses (spoken word).

JAYPEE BROTHERS

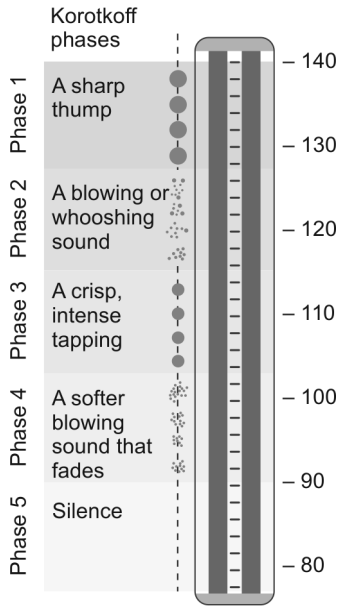
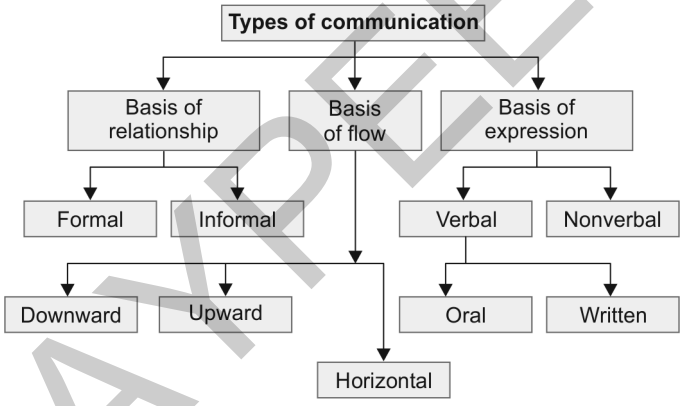


Fig. 2.4: Phases of blood pressure.

- **Receiver:** The person who receives and decodes the message
- **Decoding:** "Decoding is the process of interpreting a message to arrive at the sender's meaning."
- **Feedback:** The message the receiver returns. It indicates that the receiver understood the meaning of the sender's message.
- **Interpersonal variables**: These are factors in sender and receiver that influence communication, e.g., perception.
- **Environment:** It is the setting for sender and receiver's interaction.

Flowchart 2.2: Types of communication.



Techniques of Verbal Communication

Verbal

- G: greet
- A: ask
- T: tell
- H: help
- E: explain
- R: return

Good Communication Techniques

- Active listening—attentive to what the patient is saying verbally and nonverbally
- Share observations—make comments on how the individual looks, sounds, or acts
- Share empathy—be sensitive to the patient
- Share hope—conveys a sense of possibility
- Share humor—contributes to feelings of togetherness, closeness, and friendliness
- Sharing feelings—helps patients to share feelings by observing and encouraging communication
- Use touch—brings a sense of caring by holding a patient's hand
- Use silence—time for the nurse and client to observe one another, sort out feelings, and think of how to say things
- Asking relevant questions—ask questions one at a time, to explore the topic before going on.
- Providing information: Provide information that patient needs to know.
- Paraphrasing: Restating the patient's message so that she/he knows that the nurse is listening.
- Clarifying: Assess whether the patient understood the information.
- Focusing: Focus on key issues in the conversation.

Barriers to Communication

- Linguistic barrier
- Psychological and emotional barriers
- Human/personal barriers
- Mechanical barrier
- Physical/environmental barriers
- Cultural barriers

VITAL SIGN

Vital signs are the indicators of the body's physiologic status and response to physical, environmental, and psychological stressors. It includes temperature, pulse, respiration, blood pressure, pain, and oxygen saturation.

Purpose of Measuring Vital Sign

- To determine an individual's usual state of health
- To identify patient's responses to physical and psychological stress
- To help a physician to prescribe the right drug
- To evaluate the patient's response to therapy

Body Temperature

It is the balance between the internal and external environment of the body. It is measured in ***degree.***
Body temperature = heat produced – heat loss

Site of Temperature Measurement

Oral, rectal, axillary, tympanic membrane, temporal artery, esophagus, pulmonary artery, urinary bladder.

JAYPEE BROTHERS

Thermoregulation

The physiological and behavioral mechanism that regulates body temperature within a set point is termed thermoregulation.

Mechanism of Thermogenesis

Neural:

- Anterior hypothalamus controls heat loss (vasodilation and sweating).
- Posterior hypothalamus controls heat production (vasoconstriction and shivering).

Vascular:

Blood vessels in the skin have specialized structural and functional features that enable them to contribute to thermoregulation. Arteriovenous anastomoses (AVA) are direct connections between arterioles and venules that bypass nutritional capillaries and allow markedly increased blood flow to the skin. When there is need for heat conservation AVAs remain constricted, whereas during heat elimination they are fully dilated. Cold exposure increases the activity of the sympathetic nervous system, which is responsible for initiating cutaneous vasoconstriction. Local cooling of the extremities further amplifies the vasoconstrictor response to sympathetic nerve activity. Sympathetic vasoconstriction and local cold-induced amplification act selectively to restrict blood flow through AVAs, preserving nutritional blood flow through skin capillaries.

Factor Affecting Thermogenesis

Oxidation of food, muscular activity, hormonal effect, sympathetic stimulation, disease condition, hormonal effect, sympathetic stimulation, disease condition.

Mechanism of Thermolysis

Conduction, convection, radiation, evaporation.

Variation of Temperature

- Low pyrexia – temp. between 99 and 100°F
- Moderate pyrexia – temp. between 100 and 103°F
- High pyrexia – temp. between 103 and 105°F
- Hyperthermia – temp. >105°F
- Hypothermia – temp. <95°F

Conversion formula:

$C = (F - 32) \times 5/9$

$F = (C \times 9/5) + 32$

PULSE

Site of Measuring Pulse

- Radial pulse—anterior surface of wrist lateral to the tendon of flexor carpi radialis
- Brachial pulse—groove between biceps and triceps at antecubital fossa
- Femoral pulse—mid-inguinal point, halfway between the pubic symphysis and anterior superior iliac spine
- Popliteal pulse—at the popliteal fossa
- Posterior tibialis pulse—located on the medial side of the ankle, 2-cm inferior and 2-cm posterior to the medial malleolus
- Dorsal pedis—on top of the foot, immediately lateral to the extensor of hallucis longus
- Temporal pulse—on the temple directly in front of the ear
- Carotid pulse—groove between the anterior border of the sternocleidomastoid muscle and lateral to the thyroid cartilage

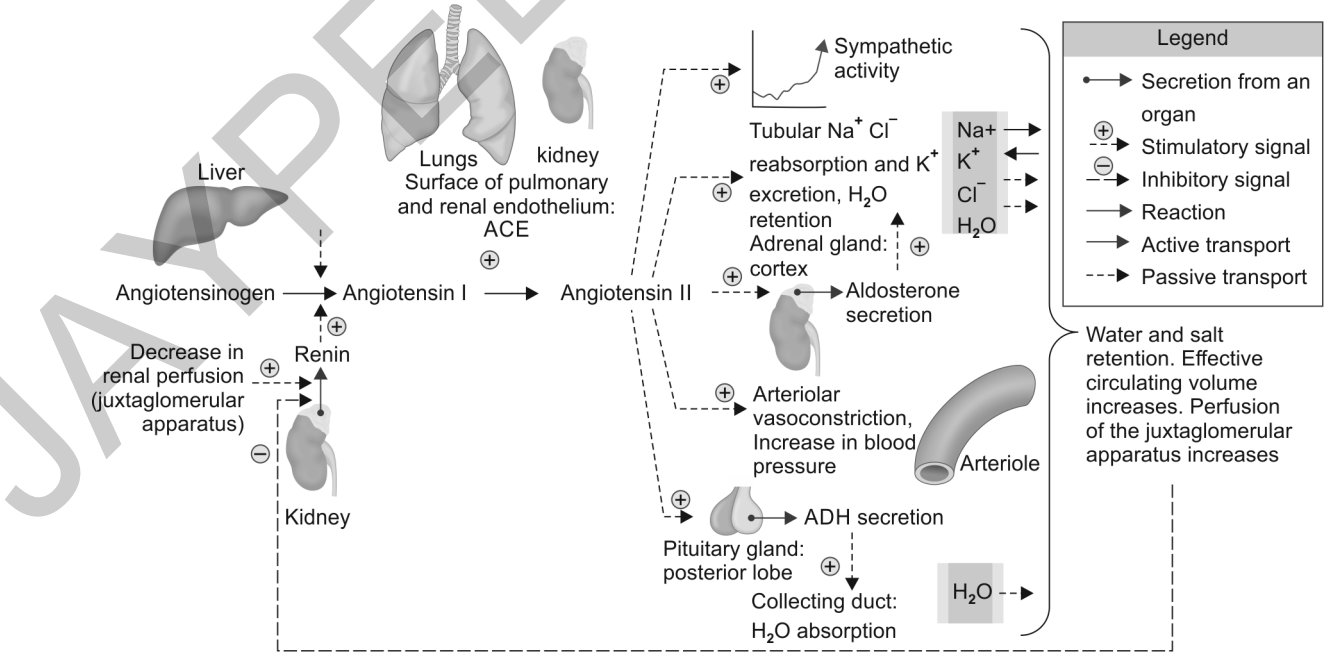


Fig. 2.5: Renin-angiotensin-aldosterone system (RAAS).

JAYPEE BROTHERS

- Facial pulse—located on the mandible on a line with the corners of the mouth
- Apical pulse—located in the 5th left intercostal space, 1.25-cm lateral to the mid-clavicular line.

Patterns of Pulse

- Tachycardia—an elevated resting heart rate >100 bpm
- Bradycardia—pulse rate below 60 bpm
- Pulsus alternans: It is a pattern of alternate strong pulse followed by a weak pulse, e.g., heart failure.
- Water hammer pulse: It is a full volume pulse that collapses rapidly, e.g., aortic regurgitation.
- Pulsus bigeminus (extra systoles)—two heartbeats closure together followed by pause, e.g., hypertrophic obstructive cardiomyopathy
- Pulsus paradoxus—a condition in which some heartbeats cannot be detected at the radial artery during the inspiration phase of respiration, e.g., sleep apnea, asthma
- Pulsus bisferiens—two pulses to each heartbeat instead of one, e.g., aortic valve diseases
- Pulse deficit—the difference between the radial pulse and the apical pulse – indicates a decrease in peripheral perfusion from some heart conditions, i.e., atrial fibrillation.

Abnormality of Respiration

Apnea: Cessation of breathing.
Eupnea: Normal breathing
Dyspnea: Labored, possibly painful, feeling of breathlessness.
Wheezing: High-pitched, musical sound heard during expiration and sometimes inspiration, associated with bronchiole or bronchi obstruction.
Bradypnea: Slow breathing rate, <12 resp./min. anesthetic drug
Tachypnea: Fast breathing rate, >24 resp./min. anxiety, exercise.
Biot's: cyclic breathing pattern of shallow breaths (2-3 breaths)alternating with periods of apnea results from neurological problems. E.g meningitis, brain injury.
Cheyne-Stokes: Cyclic breathing pattern of respirations with increasing rate & depth alternating with apnea results from drug overdose, increased ICP, heart failure, renal failure.
Kussmaul: Abnormally high rate and depth of respirations results from metabolic acidosis, diabetic ketoacidosis, renal failure.

Selecting Appropriate Size of BP Cuff

Width: 40% of MUAC
Length: 80% MUAC

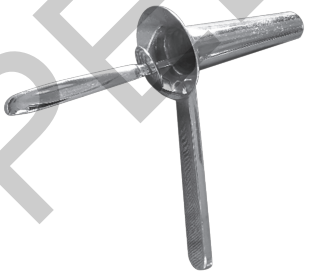
Approximate Size of BP Cuff

Age Range	*MUAC*	*Width*	*Length*
Newborn	10	4	10
Infant	15	6	15
Child	22	9	22
Adult	26	10	26

Error	*Effect*
Bladder of cuff too wide	False low reading
Bladder or cuff too narrow	False high reading
Cuff wrapped too loosely or unevenly	False high reading
Deflating cuff too slowly	False high diastolic reading
Deflating cuff too quickly	False low systolic and false high diastolic reading
Arm below heart level	False high reading
Arm above heart level	False low reading
Arm not supported	False high reading
Stethoscope that fits poorly of impairment of the examiner hearing, causing sounds to be muffled	False low systolic and false high diastolic reading
Stethoscope applied too firmly against antecubital fossa	False low diastolic reading
Inflating too slowly	False high diastolic reading
Repeating assessments too quickly	False low systolic reading
Inaccurate inflation level	Inaccurate interpretation of systolic and diastolic readings
Multiple examiners using different	
Korotkoff sounds for diastolic readings	False high systolic and low diastolic reading

JAYPEE BROTHERS

TABLE 2.1: Articles used for physical examination.

Name of the equipment	*Image*	*Uses*
Tongue depressor		It is used to depress the tongue for examination of oral cavity and throat.
Reflex hammer		To detect abnormalities in the central or peripheral nervous system.
Tuning fork		• The tuning fork was invented in 1711 by British musician John Shore. • Tuning fork sounds the note of A = 440 Hz. • It is used to assess hearing ability.
Proctoscope/ Rectoscope		• It is a short, straight, rigid, hollow metal tube, and usually has a small light bulb mounted at the end. • It is approximately 5-inches or 15-cm long. • This is used to diagnose problems with your rectum and anus.
Otoscope		• It is used to assess the ear canal and tympanic membrane. • It has two parts—head and handle. • The head contains a light source and a simple low power magnifying lens of 8 dioptres.

Contd…

JAYPEE BROTHERS

Contd…

Name of the equipment	*Image*	*Uses*
Nasal speculum		It is used to visualize the inner aspects of nose.
Sims' vaginal Speculum		• It was developed by J. Marion Sims. • It is used for examining the vagina and cervix. • It is more preferable than Cusco as it gives more exposure to the vaginal wall.
Snellen chart		• Snellen chart is named after the Dutch ophthalmologist Herman Snellen. • It is used to measure visual acuity.

COMFORT DEVICES

- Comfort is defined as "the contented enjoyment in physical or mental well-being, freedom from pain or trouble and anxiety."
- Comfort devices are mechanical devices planned to provide optimal comfort to an individual (**Table 2.2**).

Causes of Discomfort

- Pain
- Restriction of movements and exercises due to weakness
- Wrinkled, soiled, and wet bed sheets
- Delayed or inadequate attention to meet personal need such as cleanliness, elimination, nourishment, etc.
- Extreme temperature
- Inadequate ventilation, too bright light and glares, noise
- Lack of sleep
- Fear and anxiety
- Insecurity feelings

POSITIONING

Positioning a patient in bed is very important for maintaining alignment, preventing pressure ulcers, foot drops, and contractures, providing comfort, and promoting drainage (**Table 2.3**).

JAYPEE BROTHERS

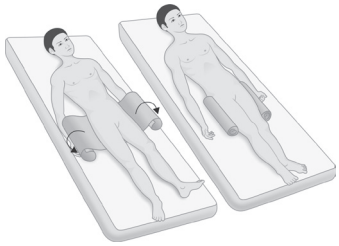
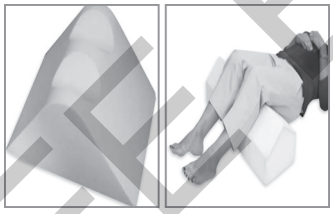
TABLE 2.2: List of comfort devices.

Name of the equipment	*Image*	*Uses*
Back rest		• To relieve dyspnea • To promote drainage from abdominal cavity • To provide a comfortable change of position
Bed cradle		• To prevent pressure from the weight of linen • To prevent the top cloth from coming in contact with the patient • To allow air to circulate around lower limbs • To apply heat in case of drying plaster casts
Cardiac table		• Used for patients with cardiac conditions and asthma • Makes it possible to use accessory muscles of respiration
Trapeze bar		• Bar is suspended from an overhead frame to the head of the bed. • The patient can grasp the bar to raise the trunk off the bed surface or to move up in bed.
Footboard		• The device that is placed toward the foot of the patient's bed to serve as support for his feet • Usually made up of wood/plastic/heavy canvas • To prevent foot drop

Contd…

JAYPEE BROTHERS

Contd…

Name of the equipment	*Image*	*Uses*
Trochanter rolls		• Used to support hips and thighs, preventing them from external rotation and keeping the feet • Used in paralysis, fracture of the femur, and hip surgery when the patient is in supine position.
Sandbags		• To relieve discomfort • To prevent foot drop or wrist drop • Provide support and shape to the body such as in fracture • Immobilize extremities and maintain specific body alignment
Wedge/abductor pillow		• It is a triangular-shaped pillow made of heavy foam. • Used to maintain legs in abduction position after THR
Knee rest		• It is placed under the knees to provide comfort. • Relieves pain in tendons beneath the knees
Bed blocks		• Used to raise the foot-end or head-end of the bed • To prevent shock • To arrest hemorrhage • To retain enema • After spinal anesthesia
Air cushion		• Used to take off the weight of the body and to relieve pressure on certain parts of the body • To promote the comfort of the client

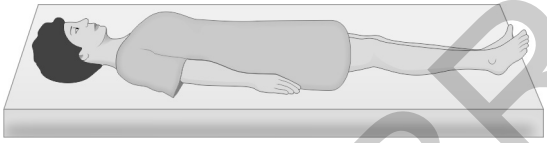
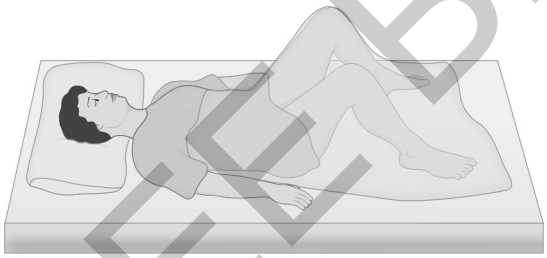
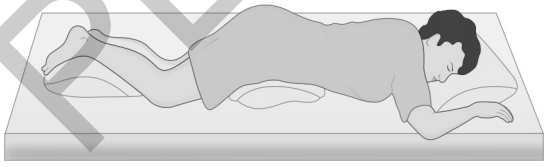
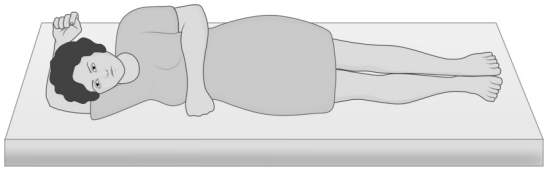
Contd…

JAYPEE BROTHERS

Contd…

Name of the equipment	*Image*	*Uses*
Rubber and cotton rings		• To prevent direct pressure on bony prominences • These are used to relieve pressure on certain parts of the body such as the elbow and heels. • To lift the hip from the bed to prevent bedsores
Hand Rolls		• Maintain thumb slightly adducted and in opposition to fingers. • Maintain fingers in slightly flexed position.

TABLE 2.3: Patient positions.

Name of the position	*Image*	*Description*	*Purpose*
Supine position		• The patient lies flat on back. • Head and shoulder may be slightly elevated by pillow.	Examination of chest and abdomen
Dorsal recumbent		The patient lies on his/her back with his/her knees bent up in an outward position while his/her feet are planted flat on the bed.	• Used for catheterization, vaginal douche, vulval, vaginal, and rectal examination • It is also used for vaginal operations.
Prone position		The patient lies on stomach with his/her head turned to the side.	• Patient with pressure sores, burns, injuries, and operations on the back. • To relieve abdomen distension • Renal biopsy • Examine the back
Lateral position		• The patient lies on the side of the body with both arms forward and his/her knees and hips flexed. • The upper leg is flexed more than the lower leg. • Pillow is given under the head, back, and front to support the arms and abdomen. • A small pillow is given in between the knees.	• In immediate postoperative patients. • Used for examination of the perineum. • For taking rectal temperature • Giving back care • For giving enema, suppositories, and colonic irrigation

Contd…

JAYPEE BROTHERS