information on nursing books, visit our website www.ejaypee.com, for detailed information on nursing books, visit our website www.ejaypee.com, for detailed information on nursing books, visit our website www.ejaypee.com

Textbook of Nursing Foundation-I

As Per Revised INC Syllabus for BSc Nursing

Semester-I





Dr. Wise
Innovative & Genius
AI Chatbot
access code inside

Bijayalaskhmi Dash
Sangeeta Kumari Mishra

JAYPEE

Contents

1. **Introduction to Health and Illness** **1**
   - Introduction to Changing Concept of Health *1*
   - Definition of Health *2*
   - Dimensions of Health *2*
   - Factors Influencing Health or Determinants of Health *4*
   - Maslow's Hierarchy of Needs Theory *6*
   - Concept of Illness *8*
   - Causes and Risk Factors for Developing Illnesses *10*
   - Epidemiological Triad Model *12*
   - Health Illness Continuum *13*
   - Health Illness Behavior *13*
   - Factors Affecting Health and Illness Behavior *15*
   - Types of Behavioral Reactions *17*
   - Impact of Illness on Patient and the Family *17*
   - Nurses Role in the Behavioral Reaction *19*
2. **Healthcare Delivery System** **22**
   - Concept of Health Care Delivery System *22*
   - Health Services Organization at Different Level in India *23*
   - Healthcare Delivery through Health Agencies *28*
   - Public Healthcare Agencies *28*
   - Primary Health Centers *29*
   - Community Health Centers *30*
   - Hospitals *32*
   - Health Clinic *36*
   - Hospice Care *38*
   - Rehabilitation and Rehabilitation Centers *40*
   - Extended Care Facility *42*
   - Level of Prevention *44*
   - Health Promotion *44*
   - Levels of Health Care *45*
   - Health Team *46*
   - Team Members and their Role *48*
   - Nurses: Roles and Responsibilities *48*
3. **History of Nursing and Nursing as a Profession** **53**
   - Introduction to Concept of Nursing *53*
   - Philosophy *54*
   - Philosophy of Nursing *55*
   - Objectives *58*
   - History of Nursing *60*
   - Nature of Nursing *64*
   - Scope of Nursing *66*
   - Nursing as a Profession *69*
   - The ICN Code of Ethics for Nurses *72*
   - Code of Professional Conduct for Nurses in India *75*
   - Beliefs *76*
   - Values *77*
   - Role and Function of a Nurse *78*
   - Qualities of a Nurse *79*

   Categories of Nursing Personnel 82
   - The Nurses Working in the Clinical Settings *82*
   - Nurses Working in the Community Areas *82*
   - Nursing Personnel in Nursing Education System *84*
4. **Communication and Nurse-Patient Relationship** **87**
   - Concept and Definitions of Communication *87*
   - Level of Communication *88*
   - Types of Communication *89*
   - Mode of Communication *93*
   - Principles of Communication *95*
   - Process of Communication *95*
   - Factors Influencing Communication *97*
   - Barriers of Communication *97*
   - Therapeutic Communication *100*
   - Professional Communication *105*
   - Relationship between Nurse and Patient (Helping Relationship) *107*
   - Phases of Therapeutic Relationship *109*
   - How to Develop Nurse-Patient Relationship *111*
   - Communicating Effectively with Patient, Patient's Family Members and Other Team Members *112*
   - Communication with the Healthcare Team *114*
   - Maintaining Effective Human Relations and Communication with Vulnerable Groups *116*
5. **Documentation and Reporting** **124**
   - Introduction to the Concept of Documentation *124*
   - Confidentiality *125*
   - Records and Reports *128*
   - Records *128*
   - Reports *131*
   - Types of Reports *132*
   - Methods of Documentation *138*
   - Electronic Medical Records (EMR) *143*

6. Vital Signs 150
- Vital Signs Measurement Purposes *150*
- Importance of Vital Signs Measurement *151*
- Body Temperature *152*
- Factors Affecting Body Temperature Regulation *154*
- Assessment of Body Temperature *156*
- Types of Thermometer *160*
- Fever (Pyrexia) *162*
- Tepid Sponging *165*
- Cold Sponging *165*
- Care in Rigor *166*
- Pulse *167*
- Respiration *171*
- Respiration Measurement *176*
- Blood Pressure *176*
- Physiology of Blood Pressure *177*
- Regulation of Blood Pressure *178*
- Measuring of Blood Pressure *179*
- Alteration in Blood Pressure *180*
- Guidelines for Measuring of Blood Pressure *181*
- Common Errors in BP Assessment *182*

7. Equipment and Linen 185
- Types of Equipment *186*
- Care of Equipment *187*
- Care of Enamel Ware *192*
- Care of Glassware *193*
- Care of Furniture *194*
- Care of Stainless Steel Goods *195*
- Disposable Items *195*
- Reusable Items *195*
- Indent *196*
- Inventory *197*
- Inventory Control *197*
- ABC Analysis *198*
- VED Analysis *199*
- Condemnation of Equipment *199*
- Role of Nurse in Material Management *200*

8. Introduction to Infection Control in Clinical Setting 202
- Chain of Infection *203*
- Types of Infection *209*
- Stages of Infection *210*
- Factors Increasing Susceptibility to Infection *210*
- Body Defenses Against Infection *212*
- First Line of Defense *212*
- Second Line of Defense *214*
- Third Line of Defense: Immune Response *215*
- Types of T Lymphocytes *216*
- Healthcare-Associated Infection (Nosocomial Infection) *217*
- Hospital Infection Control Committee (HICC) *221*
- Hand Hygiene *222*
- Standard Precautions *223*
- Biomedical Waste Management *229*
- Biomedical Waste *229*
- Segregation of Waste *230*

9. Comfort, Rest and Sleep and Pain 236
- Comfort *236*
- Types of Beds *237*
- Bed Making *239*
- Open Bed *239*
- Occupied Bed *242*
- Amputation Bed *243*
- Operation Bed/Recovery Bed/Postanesthetic Bed/Postoperative Bed *243*
- Closed (Unoccupied) Bed *244*
- Blanket Bed *245*
- Cardiac Bed *245*
- Fracture Bed *246*
- Burn Bed *246*
- Therapeutic Positions *246*
- Comfort Devices *252*
- Sleep and Rest *255*
- Normal Sleep Requirements *256*
- Physiology of Sleep *257*
- Stages of Sleep *258*
- Factors Affecting Sleep *259*
- Promoting Rest and Sleep *260*
- Sleep Disorders *261*
- Pain *265*
- Patient Controlled Analgesia *275*
- Nonpharmacological Management of Pain *275*
- Complementary and Alternative Healing Modalities *278*

10. Promoting Safety in Healthcare Environment 282
- Patient Safety *282*
- Global Action on Patient Safety *286*
- National Patient Safety Goals *286*
- Environment *289*

- Falls in Health Care Facilities *292*
- Accidents *295*
- Poisoning *296*
- Fires *299*
- Falls at Home *300*
- Burns and Scalds *301*
- Suffocation *301*
- Role of Nurse in Providing Safe and Clean Environment *302*
- Restraints *303*
- Other Safety Devices *309*

11. Hospital Admission and Discharge 313
- Admission to the Hospital Unit *314*
- Types of Admission *315*
- Admission Bed *315*
- Medicolegal Issues *317*
- Role of Nurse in Admission of Medicolegal Cases *318*
- Nurses Responsibilities during Admission of a Patient *319*
- Discharge from Hospital *320*
- Types of Discharge *320*
- Discharge Planning *320*
- Discharge Procedure *321*
- Transferring a Patient *321*
- Care of Unit after Discharge *322*

12. Mobility and Immobility 325
- Body Mechanics *325*
- Body Alignment *326*
- Body Balance *327*
- Coordinated Body Movement *327*
- Joint Mobility *327*
- Factors Affecting Body Alignment and Activity *328*
- Pathological Factors Affecting Body Alignment and Activity *328*
- Nonpathological Factors Affecting Body Alignment and Activity *331*
- Maintenance of Normal Body Alignment and Activity *332*
- Exercise *334*
- Effects of Immobility *338*
- Range of Motion Exercises *339*
- Muscle Strengthening Exercises *340*
- Lifting Techniques *351*
- Moving and Lifting of Patients *351*
- Transfer Techniques *352*
- Care of Patients with Immobility using Nursing Process Approach *354*
- Assisting Clients with Ambulation *357*
- Care of Patient with Cast and Splint *361*
- Types of Cast *362*
- Splint *365*

13. Patient Education 368
- Goal of Patient Education *369*
- Importance of Patient Teaching *369*
- Purposes of Patient Teaching *369*
- Teaching Learning Process *369*
- Domains of Learning *369*
- Integrating Nursing Process in Patient Teaching *372*
- Nursing Diagnosis *373*
- Programmed Instruction *376*
- Five Rights of Patient Teaching *377*
- Evaluation *378*
- Role of Nurse in Patient Education *381*

14. First Aid 387
- First Aid and the Law *389*
- Purpose of First Aid *390*
- Basic Principles of First Aid *391*
- Scope of First Aid *392*
- Dealing with an Emergency *393*
- Wound *395*
- Hemorrhage *398*
- Shock *400*
- Musculoskeletal Injuries *401*
- Fractures *401*
- Dislocations (Injuries to Joints) *403*
- Strains and Sprains (Injuries to Ligaments, Muscles and Tendons) *403*
- Respiratory Emergencies *404*
- Resuscitation (Basic CPR) *405*
- Unconsciousness *408*
- Recovery Position *410*
- Foreign Bodies in Eye, Ear, Nose or Skin and Stomach *411*
- Foreign Body in the Eye *411*
- Foreign Body in the Ear *412*
- Foreign Body in the Nose *413*
- Foreign Body in the Skin *413*
- Swallowed Foreign Objects/Foreign Bodies in Stomach *414*

- Burn Wounds *415*
- Dry Burns and Scalds (Burn from Flames, Hot Surfaces, Steam) *417*
- If Burn is Minor (Small Size First and Second Degree Burns) *419*
- Specific Burn Locations *419*
- Electrical Burns and Electrocution by Electricity or Lightning *420*
- Chemical Burns *421*
- Prevention of Burns *422*
- Heat Exhaustion *423*
- Heatstroke *423*
- Frostbites *424*
- Poisoning *425*
- Bites and Stings *426*
- Snakebites *427*
- Insect Stings and Bites *428*
- Community Emergencies *429*

Index *439*

Chapter

6 Vital Signs

Learning Objectives

On completion of this chapter, the students will be able to:

- Enumerate principles importance of vital signs measurement.
- Develop guidelines for assessing vital signs.
- Elaborate physiology, regulation and factors affecting body temperature.
- Describe types of thermometer.
- Identify different ways of losing body temperature.
- Measure all vital signs.
- Treat and manage fever.
- Perform tepid sponging and cold sponging.
- Provide care in rigor.
- Explain physiology and regulation, characteristics, factors affecting pulse.
- Identify different sites of pulse measurement.
- Assess pulse and calculate pulse rate.
- Identify any abnormal pulse.
- Enumerate physiology and regulation, mechanics of respiration.
- Identify the characteristics and factors affecting respiration.
- Assess any normal and abnormal respirations.

JAYPEE BROTHERS

INTRODUCTION

The importance of vital sign is mainly for assessment of physiological and psychological status of health are measurements of the body's most basic functions. The four main vital signs routinely monitored by medical professionals and healthcare providers include body temperature, pulse rate, respiration rate and blood pressure. Vital signs are a quick and efficient way of monitoring a patient's condition or identifying problems and evaluating the patient's response to intervening changes. One vital sign can influence characteristics of other vital signs.

The basic techniques of inspection, palpation and auscultation are used to determine vital signs. Assessment of vital signs allows the nurse to identify nursing diagnoses, to implement planned intervention and to evaluate success. When the nurse learns the physiological variables influencing vital signs and recognizes the relationship of vital sign changes to other physiological assessment findings, precise determination of the client's health problems can be made.

Vital signs measurement involves assessing key physiological parameters that reflect a person's health status. The vital or cardinal signs are body temperature, pulse respiration and blood pressure. These signs should be looked at in total, to monitor the vital functions of the body. The signs reflect changes in functions that otherwise it might not be observed. Vital signs are the measurements, provided data can be used to determine the patient's usual state of health.

VITAL SIGNS MEASUREMENT PURPOSES

- To assess the health status of an individual.
- To plan and implement the nursing care.
- To understand the effectiveness of the treatment.
- To modify or change the mode of treatment.
- Routine part of complete physical assessment.
- It helps to understand the present problem.

IMPORTANCE OF VITAL SIGNS MEASUREMENT

Vital signs helps the nurse to:

- Identify specific life-threatening conditions and plan the needed nursing interventions.
- Detect changes in the client's health status.
- Vital signs/cardinal signs in a normal healthy individual remains constant any deviation can indicate a sign of disease and alert nurses to take necessary precaution.
- Early warning scores have been proposed that combine the individual values of vital signs into a single score. This was done in recognition that deteriorating vital signs often precede cardiac arrest and/or admission to the intensive care unit.

Why these are Called "Vital Signs"

- These measurements are critical to a clinical evaluation and are the first step in any medical exam.
- These findings are governed by vital organs and often divulge even the slightest deviation from the normal body functions.
- The changes in the condition of the client, improvement or deterioration may be detected by the observation of these signs.
- Significant variations in these findings may indicate problems relating to insufficient consumption of oxygen, blood depletion, observation electrolyte imbalance, bacterial invasion and other problems.
- Through these signs, specific information may be obtained that will help in the diagnosis of disease, the result of treatment, medications and nursing care.
- These measurements provide clues about possible diseases, and show progress toward recovery.
- Even the client's emotional state may also cause a significant variation in these symptoms.
- The presence of these measurements confirms life, and their absence confirms death.

Guidelines for Assessing Vital Signs

- The nurse caring for the patient is responsible for assessing vital signs. The nurse should obtain the vital signs, interpret their significance and make decisions about interventions.
- Ensure that all equipment used for measuring vital signs is functioning properly to guarantee accurate results. The validity and reliability of the equipment should be checked.
- Equipment should be selected based on the client's condition and characteristics (e.g., age, size, medical history).
- Control or minimize external factors (e.g., noise, temperature) that could affect vital signs during assessment.
- The nurse uses an organized, systematic approach when taking vital signs. Each procedure requires a step-by-step approach to ensure accuracy. Use a consistent, step-by-step approach when measuring vital signs to maintain accuracy and reliability. Use standardized methods and equipment to ensure that vital signs are measured consistently and accurately.
- The manner of approach to the patient can alter the vital signs. Approach the patient in a calm and caring manner to help reduce anxiety, which can influence vital signs.
- Based on patient's condition, the nurse should collaborate with the physician to decide the frequency of vital signs assessment. Generally, the frequency of measurement of vital sign increases with worsening of condition.
- The nurse should have at least the knowledge of baseline normal value of vital signs and the deviations from normal ranges as she should analyze the results of vital signs measurements and evaluate overall clinical findings. A client's normal range may differ from the standard range for that age or physical state. Normal values for a client serve as a baseline for comparing in condition over time.
- Verify and communicate any significant changes in vital signs to the appropriate healthcare providers, including notifying the physician of abnormal findings. Highlight and describe if any abnormal finding noticed by the nurse.
- Document vital signs accurately and communicate them to the next caregiver to ensure continuity of care.
- The nurse should have knowledge on the client's medical history and therapies or medication, for vital sign changes.

Timings of Taking Vital Signs

- On patient's admission to a healthcare facility.
- In hospital, on routine schedule according to physician's order or hospital policy.
- During patient's visit to clinic or physician's office.
- Before and after any surgical procedure.
- Before and after any invasive diagnostic procedure.
- Before and after administration of medication that affect cardiovascular, respiratory and temperature control function.
- When the patient's general physical condition changes, e.g., loss of consciousness or increase in intensity of pain.

JAYPEE BROTHERS

- Before and after nursing interventions influencing any one of the vital signs, e.g., before ambulating a patient previously on bed rest or before patient performs range of motion exercises.
- Whenever patient reports to nurse any non-specific symptoms of physical distress, e.g., 'feeling funny or different.

Principles of Vital Signs

- Vital signs are governed by vital organs and often reveal even the slightest deviation from the normal body functions.
- The changes in the condition of the patient improvement or regression may be detected by the observation of these signs.
- It gives the baseline understanding about the patient. By knowing the normal ranges for vital signs (temperature, pulse, respiration, blood pressure) we can identify any deviations from baseline.
- Significant variations in these findings may indicate problems regarding to insufficient consumption.
- Vital signs are not isolated. They reflect the overall health status of the patient. Consider factors, such as age, medical history, and current condition.
- Through vital signs, specific information may be obtained that will help in the diagnosis treatment medications and nursing care.
- Helps in providing patient-centered care based by taking their unique circumstances and comfort into account during assessments.
- Patients emotional state may also cause a significant variation in these symptoms.

Vital Signs and Normal Values

- **Temperature:** 98.6°F or 37°C in adults.
- **Pulse:** 72 beats/minute in adults.
- **Respiration:** 16 breaths/minute in adults.
- **Blood pressure:** 120/80 mm Hg in adults.

BODY TEMPERATURE

Body temperature is a vital sign that indicates the body's ability to generate and dissipate heat. It reflects the balance between heat produced by metabolic processes and heat lost to the environment. It is a measure of the heat within the human body and is an important indicator of overall health. It reflects the balance between heat produced by the body and heat lost to the environment. Temperature is a degree of heat maintained by the body. Average normal temperature generally around 98.6°F (37°C). This can vary slightly from person to person. Regular monitoring of body temperature is essential for assessing a patient's health status. It can help detect infections, monitor response to treatment, and indicate other underlying conditions. Proper techniques and considerations during measurement are crucial for obtaining accurate readings.

The normal range typically between 97°F (36.1°C) and 99°F (37.2°C). Oral temperature: 98.6°F (37°C), rectal temperature/tympanic: 99.6°F (37.5°C), axillary temperature: 97.6°F (36.4°C).

Physiology of Body Temperature Maintained

Body temperature is of two types core temperature and the surface temperature. Core temperature is the most important, including deep tissues, such as temperature of cranial, thoracic and abdominal cavities. Normal body temperature depends on when, where and in whom it is measured. The body has a regulatory system that keeps the core temperature normal and may vary depending upon the heat produced and the blood flow.

Thermoregulation is the process by which the body maintains its core temperature within a safe range. The body's core temperature typically ranges between 36.5°C and 37.5°C (97.7°F and 99.5°F). This process is controlled by the hypothalamus, a region of the brain responsible for regulating body temperature and other homeostatic functions. Body temperature is regulated by balancing the amount of heat the body produces with the amount of heat the body loses. Body heat is produced as a by-product of metabolism, which is the sum of all biochemical an physiological processes that take place in the body. The heat regulating center is the hypothalamus situated in the brain. Heat is produced in the body continuously. Unless it is lost from the body, no balance can be maintained.

Heat Production

Heat is generated in the body's cells through food metabolism. The body converts energy supplied by metabolized nutrients to energy form which can be consumed by body directly. One form of this energy is the thermal energy for regulating body temperature. It is measured in terms of heat. These types of heat liberation are expressed as metabolic rate and measured as BMR. Mostly the heat is produced by deep tissue organ (brain, liver, heart) and skeletal muscles. Skin, subcutaneous tissues and fat of subcutaneous tissues serve as heat insulators for the body. When the body heat rises, hypothalamus transmits impulses to reduce the body heat by triggering perspiring, dilating blood vessels and inhabitation of heat production. In case of decreased body heat, hypothalamus spread impulses to stimulate heat production through vasoconstriction (narrowing of blood vessels) muscle shivering and piloerection.

JAYPEE BROTHERS

Mechanisms of Heat Production

- **Metabolism:** The body generates heat as a by-product of metabolic processes. The breakdown of food into energy involves various biochemical reactions that produce heat. Basal metabolic rate (BMR) is the rate of energy expenditure at rest and varies based on factors, such as age, sex, and body composition.
- **Muscle activity:** Physical activity increases heat production. Muscle contractions, such as during exercise or shivering, generate heat.
- **Involuntary muscle contraction:** Shivering is a rapid, involuntary contraction of skeletal muscles that produces heat. This mechanism is activated when the body is exposed to cold temperatures.
- **Thermogenesis:** Brown adipose tissue (brown fat) generates heat through the process of thermogenesis, particularly in infants and during cold exposure. This involves metabolic processes that convert energy directly into heat instead of storing it.
- **Hormonal regulation:**
  - Thyroid hormones (e.g., thyroxine) regulate metabolism and influence heat production. An increase in these hormones raises the metabolic rate, resulting in more heat.
  - Hormones, such as adrenaline can stimulate metabolic processes that increase heat production, particularly in response to stress or cold.
- **Diet-induced thermogenesis:** The process of digesting, absorbing, and metabolizing food generates heat. Certain foods, particularly those high in protein, can lead to increased heat production after consumption.

Mechanisms of Heat Loss (Fig. 6.1)

The mechanisms of heat production and loss work together to regulate body temperature, allowing the body to adapt to varying environmental conditions. Understanding these processes is important for managing conditions related to thermoregulation, such as heat exhaustion or hypothermia. The methods of heat loss are:

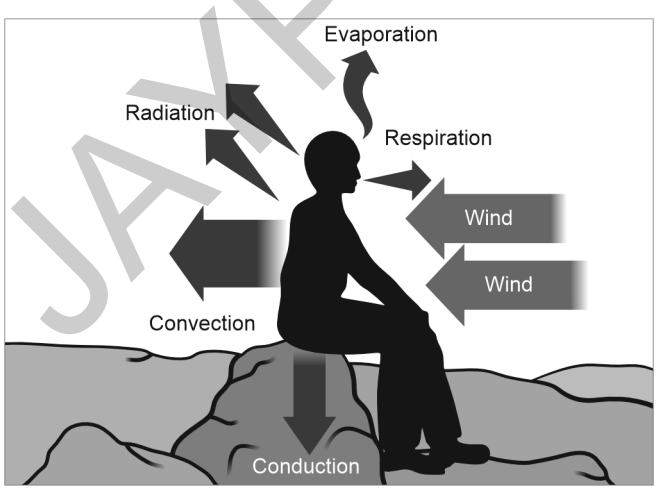

Fig. 6.1: Mechanisms of heat loss.

Through Skin

The skin on our body plays a vital role in maintaining our body temperature through its many components that perform various processes in response to any external temperature stimulus. Through the skin body lost its temperature by following the principles of conduction convection, radiation and evaporation. This is the major way to reduce body temperature.

- **Conduction:** Transfer of heat from body to substance directly in contact. It is the transfer of heat directly from hot part to the cold from one molecule to the other (by direct contact). Heat is transferred by conduction from the body to any substance in contact with the body, such as air, clothes, foodstuffs, water, etc. Very little heat is lost by conduction
- **Radiation:** Transfer of heat from body to heat waves which travel through the space. Radiation is the transfer of heat from the surface of one object to another which are not in contact with each other. These waves travel through the space without causing any appreciable change in the temperature of the air. About 60% of the body heat is lost through radiation.
- **Evaporation:** Transfer to heat from body in form of vapors (liquid is converted into vapors). Evaporation is the process by which a substance in liquid state is changed into vapour. Such a process requires heat. Body loses a large amount of heat by way of evaporation of perspiration and sweat.
- **Convection:** It is transfer of heat from the surface of one subject to the surface, such as from the body through skin by movements of air or fluid particles. It is the method of the transfer of heat by circulating air or liquid and it depends upon the air movement and the temperature of the atmosphere.

Through the Lungs

The temperature of the air which is taken to the lungs is that of the atmosphere and it is lower than that of the body temperature. On entering the respiratory tract, it is warmed to that of the body temperature by absorbing heat from the lung tissue. As the individual breathes out, the warm air is lost through the expired air. Approximately 300 mL of water is also vapourised from the lungs daily.

Through the Kidneys

The kidneys secrete urine which is warmed by the heat taken from the body. As the urine is excreted, some amount of heat is also lost from the body.

JAYPEE BROTHERS

Through the Bowels

The feces that is formed in the bowels absorbs heat from the body. So when an individual defecates some amount of heat is also lost from the body.

Role of Hypothalamus (Fig. 6.2)

The mechanism of heat production and loss are controlled by the hypothalamus. The hypothalamus acts as the body's thermostat. It receives input from temperature receptors located in the skin and internal organs and responds to changes in temperature by initiating appropriate physiological responses.

When Body Temperature Rises

When body temperature rises vasodilation occur. Blood vessels near the skin's surface dilate, increasing blood flow to the skin and promoting heat loss through radiation and convection. Sweat glands are activated to increase perspiration, which cools the body through evaporation.

When Body Temperature Falls

When body temperature falls vasoconstriction occur. Blood vessels constrict, reducing blood flow to the skin to minimize heat loss. Rapid muscle contractions generate heat through increased metabolic activity which is called shivering. The behavioral responses make the individual for seeking warmth, wearing additional clothing, or altering environmental conditions help to maintain body temperature.

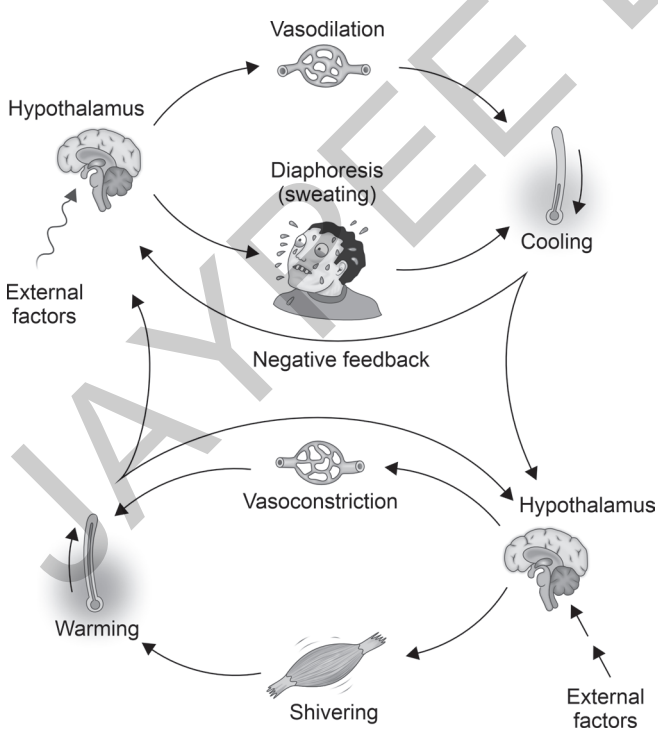

Fig. 6.2: Role of hypothalamus in maintaining body temperature.

Regulation of Body Temperature during Fever by Human Behavior

People get a fever when their brain sets the body temperature higher than normal. This may happen as a reaction to germs, such as viruses or bacteria, but it can also happen as a reaction to substances that are made by the body, such as prostaglandins. Our body produces prostaglandins to fight off germs.

A body temperature of 38°C (100.4°F) or more is considered to be a fever in adults. Temperatures above 39.5°C (103.1°F) are considered to be a high fever, and very high fever is defined as any temperature above 41°C (105.8°F). A temperature between 37.5°C and 38°C is an elevated body temperature.

Care of the patients in fevers focuses on reducing the elevated body temperature. When the patient's temperature is moderately elevated, various methods of reducing the temperature be started. The room temperature should be maintained at a comfortable temperature. The room should be well ventilated. The blankets and excess clothing should be removed but prevent the patient from getting draughts. The various methods used for cooling the body are:

- Exposure to cool air an electric fan. Administration of cool drinks
- Application of cold compress and ice bags
- Cold sponging and cold packs
- Cold bath
- Ice cold lavages and enemas
- Use of hypothermic blankets of mattresses.

By this, the body will lose temperature by following the process of heat loss by conduction, convection, radiation and evaporation. When surface cooling is used treatment is directed at not only cooling the body but also preventing shivering. Shivering must be prevented because it increases metabolic activity, produces heat, increases the oxygen usage markedly, increases circulation, may cause hyperventilation and respiratory alkalosis. It takes longer time to reduce body temperature in a shivering patient.

FACTORS AFFECTING BODY TEMPERATURE REGULATION (FIG. 6.3)

Body temperature regulation is influenced by several factors. Some of the factors are responsible for heat production, some of the factors help in heat loss and some common factors in which the variation of body temperature can be observed.

JAYPEE BROTHERS

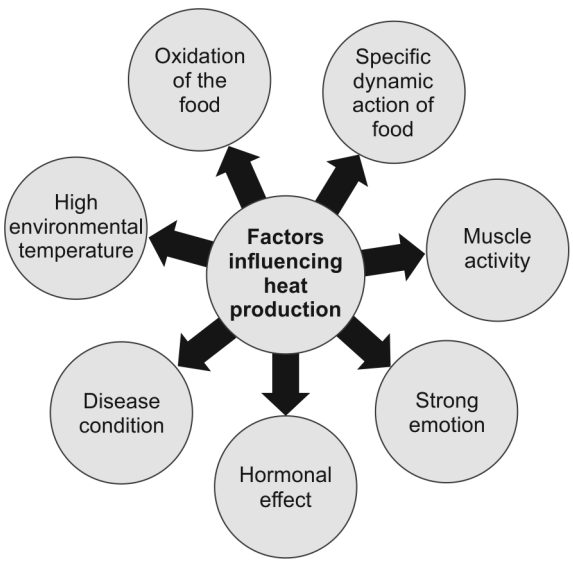

Fig. 6.3: Factors influencing heat production.

Factors Influencing Heat Production

- **Oxidation of the food:** During the metabolism of protein, carbohydrate and fat, heat is produced as a by-product. One gram of carbohydrate give 4 calories of heat. One gram of protein give 4 calories of heat. One gram of fat gives 9 calories of heat.
- **Specific dynamic action of food:** There is an increase in the production of energy in the form of heat after taking food. This is not due to the work in digestion or absorption but is due to the stimulating effect of food on basal metabolism. It is known as specific dynamic action of food and it varies according to the different nutrients.
  - Specific dynamic action of fat is 4%.
  - Specific dynamic action of carbohydrate is 5 to 6%.
  - Specific dynamic action of protein is 30%.
  - Specific dynamic action of mixed diet is 12%.
- **Muscle activity:** During exercise, heat is produced faster than it is eliminated from the body. During exercise, the glycogen which is stored in the body will be released and broken down into sugars with the release of energy.
- **Strong emotion:** Excitement, anxiety, nervousness, etc., stimulate the autonomic nervous system which causes stimulation of the different organs in the body including the secreting glands. Stimulation of the sympathetic nervous system can increase the production of the epinephrine and norepinephrine, thereby increasing metabolic activity and heat production. Highly stressed or anxious client could have an elevated body temperature for that reason.
- **Hormonal effect:** Increased activity of the thyroid gland a the adrenal gland raises the body temperature Ovarian hormone (progesterone) produces a rise in the body temperature. When these hormones are released into the blood, they stimulate the oxidation process and a large amount of heat is produced in the body.
- **Disease condition:** Fever or pyrexia is caused by the bacterial invasion. It is the protective action of the body against the invading bacteria. The degree of temperature depends upon the severity of infection.
- **High environmental temperature:** High room temperature increases the body temperature (by preventing the evaporation process). Very high external temperature may upset the heat regulating mechanism and the temperature of the body will be increased to high levels, e.g., sun stroke, heat stroke, etc.

Factors Influencing Heat Loss (Fig. 6.4)

- **Sleep:** During sleep body temperature is low. Particularly in the deeper stages of sleep, the body's metabolism slows down, leading to a decrease in overall heat production. This drop in body temperature helps facilitate restful sleep and conservation of energy. The reduced metabolic rate means the body generates less heat, which can contribute to an increase in heat loss, especially if the sleeping environment is cool.
- **Fasting:** Fasting leads to decreased heat production. Fasting or severe caloric restriction reduces the amount of energy available for metabolism. This can lead to a decrease in the body's basal metabolic rate (BMR), which in turn reduces heat production. Without sufficient food intake, the body conserves energy by lowering its metabolic activities, which results in reduced heat production and increased susceptibility to heat loss.

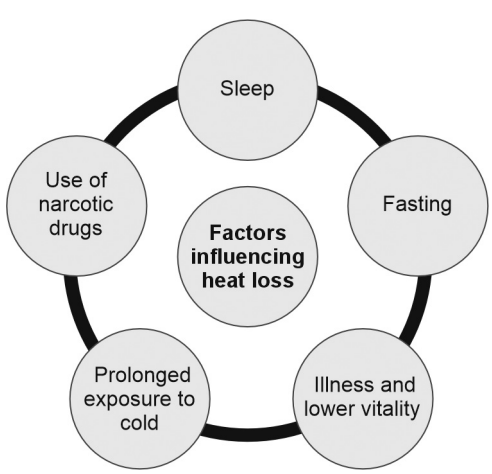

Fig. 6.4: Factors influencing heat loss.

JAYPEE BROTHERS

- **Illness and lower vitality:** Illnesses, particularly those affecting the nervous system or metabolic processes, can impair the body's ability to regulate heat. A depressed nervous system or reduced vitality often leads to decreased metabolic rate and lower heat production. This impairment can make the body more prone to losing heat and struggling to maintain a stable internal temperature.
- **Prolonged exposure to cold:** Prolonged exposure to cold environments challenges the body's ability to maintain its core temperature. The body loses heat more rapidly when exposed to cold conditions, especially if there is inadequate insulation or protection. Over time, this can lead to hypothermia or other cold-related conditions as the body's mechanisms for heat production and retention become overwhelmed.
- **Use of narcotic drugs:** Narcotic drugs can affect the central nervous system, leading to alterations in temperature regulation. Many narcotics have depressant effects, which can slow down metabolic processes and reduce the body's ability to generate and retain heat. This can result in increased heat loss and a greater risk of hypothermia, especially if combined with other factors like exposure to cold.

Normal Variation in the Body Temperature

- **Time of the day:** It is less in the morning and more in the evening.
- **Time of the month:** Menstruation causes a sudden fall in the temperature and rises slowly after ovulation to a maximum just before the next menstrual period.
- **Age of the person:** Normally young people have higher temperature than the old people. But infants are greatly influenced by the temperature of the environment and must be protected from extreme changes. Older people are at risk of hypothermia for a variety of reasons, such as inadequate diet, loss of subcutaneous fat, lack of activity, and reduced thermoregulatory property.
- **Part of the body where the temperature is taken:** The temperature is highest when taken by rectum. It is 1°F higher than the oral temperature. The temperature is lowest when taken by axilla. It is 1°F less than the oral temperature. Oral temperature is considered as appropriate temperature.
- **Emotions:** The temperature may vary in persons with strong emotions.
- **Fasting:** The person who take no food may have a low temperature.
- **Exercises:** A heavy exercise increases the body temperature. Rest and sleep reduces the body temperature.

Conservation of the Body Heat

The body heat is conserved by the type of clothing that is worn. Cotton garments are good conductors of heat. Therefore, they help to eliminate the excessive body heat in summer. The woolen garments and blankets are used in the winter season. Wool is a bad conductor of heat because of the air trapped in the interlocking space of the material which thereby prevents the heat loss from the body. Use of hot water bottles and hot drinks help to maintain the body temperature in a client who is exposed to cold. Rubbing the skin surface raises the body temperature by friction which changes the mechanical energy into thermal energy. Cool drinks and cold sponges reduce the temperature by the evaporation of moisture from the skin. In a healthy individual, the body temperature may vary between 97° and 99°F (36.1 to 37.2°C).

ASSESSMENT OF BODY TEMPERATURE

Assessing body temperature is crucial in various medical and everyday contexts, as it helps gauge a person's health and identify potential issues. Temperature is a measurement of heat expressed in degrees. Body temperature may be defined as the degree of heat maintained by the body. Temperature means the degree of warmth or balance maintained body, temperatures, and heat lost (thermolysis) in the body. Assessment of body temperature is important for decisions in nursing care, medical diagnosis, treatment and the need of laboratory tests.

Normal Body Temperature for Adults

- **Oral:** 37°C or 98.6°F
- **Rectal:** 37.6°C or 99.6°F
- **Axillae:** 36.4°C or 97.6°F.

Common Sites for Taking Body Temperature

1. Mouth, 2. Axilla, 3. Groin, 4. Vagina, 5. Rectum.

Oral Temperature (Fig. 6.5)

Temperature check by the oral cavity.

Purpose

- To determine the body temperature of the patient.
- To aid in making diagnosis.
- To monitor chronic conditions.
- To monitor treatment effects.
- To assess general health status.
- To manage hyperthermia.
- To ensure patient's safety.

JAYPEE BROTHERS

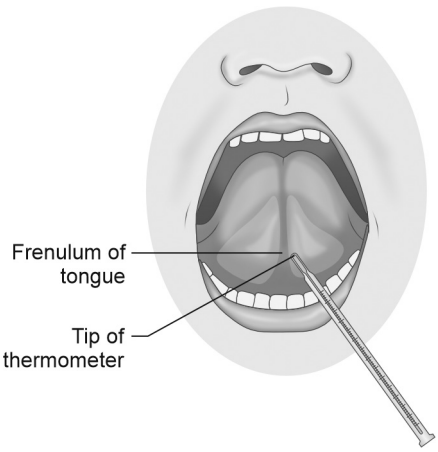

Fig. 6.5: Placing oral thermometer.
(For color version, see Color Plate 1)

General Instructions

- Position the tip of the thermometer under the patient's tongue, as far back as possible on either side of the frenulum linguae.
- Placing the tip in this area, promotes contact with superficial blood vessels and contributes to an accurate reading.
- Instruct the patient to close his lips but to avoid biting down with his teeth.
- Biting can break the thermometer, cutting the mouth or lips or causing ingestion of broken or mercury.
- Leave a mercury thermometer in place for at least two minutes or a chemical-dot thermometer in place for 45 seconds to register temperature, for an electronic thermometer wait until the maximum temperature is displayed.
- For a mercury thermometer remove and discard the disposable sheath then read the temperature at eye level, noting it before shaking down the thermometer, note the temperature, then remove and discard the probe cover.
- For the chemical dot thermometer, read the temperature as the last dye dot that has changed color, or fired, then discard the thermometer and its dispenser case.

Preliminary Assessment

- Determine the need to measure client's body temperature.
- Assemble equipment.
- Check the physician order, patient's condition can the patient able to hold thermometer in mouth
- Assess the site (oral condition)
- Choose the right thermometer based on availability and patient's condition

Preparation of Articles

- Oral clinical thermometer.
- Swab in a container.
- Kidney basin or thermometer container.
- Blue pen.
- Watch with second hand.
- Graphic TPR chart.
- Paper bag.

Preparation of Patient

- Identify the patient, greet the patient and explain the procedure.
- Place the client in comfortable position,.
- Assess site for temperature measurement.
- Wait 20 to 30 minutes before measuring oral temperature if client has ingested hot or cold liquid or foods.
- Note any recent use of medications that could impact temperature

Procedure

- Hold the color coded end of system glass thermometer with finger tips.
- If thermometer stored in disinfectant solution, rinse in cold water before using.
- Take swab and wipe thermometer bulb end towards fingers in rotating fashion. Dispose of tissue.
- Read mercury level while holding thermometer horizontally and gently rotating at eye level. If mercury is above desired level, grasp at the tip of thermometer securely and sharply flick wrist down ward. Continue shaking until reading is below 35.5°C.
- Ask client to open mouth and gently place thermometer under tongue in posterior sublingual, lateral to central of lower jaw.
- Ask client to hold thermometer with lips closed. Caution against biting down on thermometer.
- Leave thermometer in place for 2 minutes or according to agency policy.
- Carefully remove thermometer and read at eye level while holding thermometer horizontally.

After Care

- Wipe secretions from thermometer with soft tissue. Wipe in rotating fashion from fingers towards bulb. Dispose of tissue.
- Wash thermometer in lukewarm water, rinse in cool water, dry and replace in container.
- Record the temperature on the chart (how to plot on TPR chat is shown in **Figure 6.6**).

JAYPEE BROTHERS

- Wash hands.
- Report any unusual variation to the charge nurse.

Contraindications

- Injuries, inflammation and surgeries of oral cavity.
- Infants, children below 6 years, and patients who cannot retain thermometer in mouth.
- Unconscious, delirious, non cooperative and mentally disturbed patients.
- Patients with mouth breathing, convulsions, oxygen masks, frequent and severe cough.
- The clients having convulsion.
- Mouth breather patients.
- Persons suffering from frequent attacks of cough.

Auxiliary Temperature (Fig. 6.7)

The temperature is sometimes taken by axilla when it cannot be taken by mouth or contraindicated to check oral temperature.

Purpose

- To determine the body temperature of the patient.
- To aid in making diagnosis.
- To monitor chronic conditions
- To monitor treatment effects
- To assess general health status
- To manage hyperthermia
- To ensure patient's safety

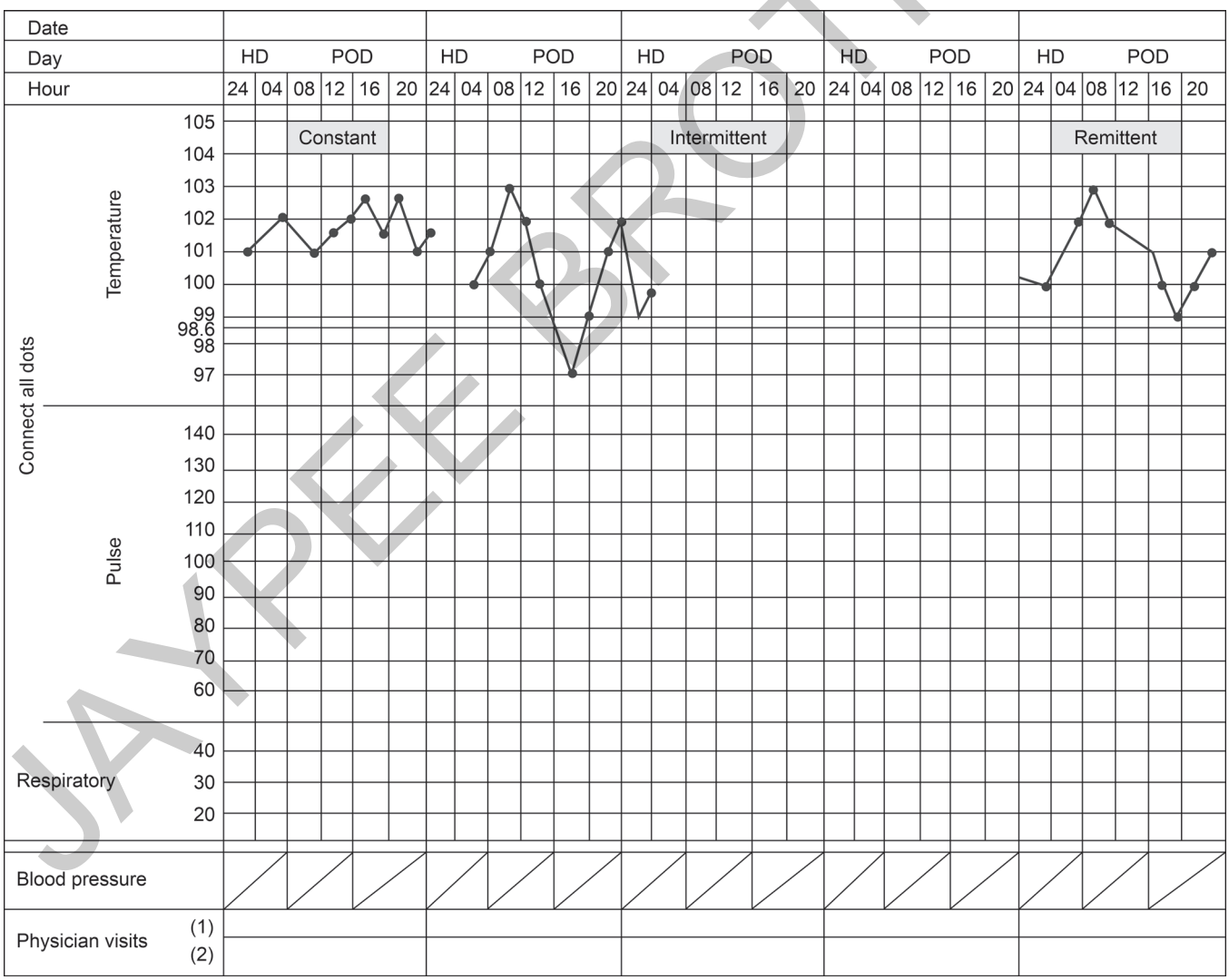

Fig. 6.6: Plotted TPR chart.

JAYPEE BROTHERS

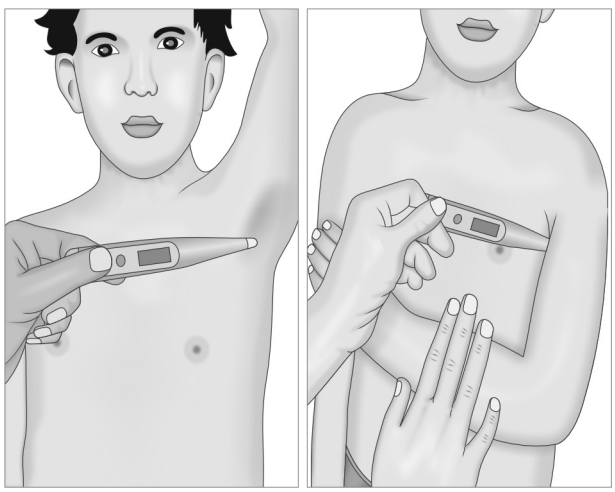

Fig. 6.7: Placing thermometer inaxilla.

Preliminary Assessment

- Assess the patient's condition and physician order.
- Determine the need to measure client's body temperature.
- Assemble equipment.
- Take the history of fever and medication use.

Preparation of Articles

- Clinical thermometer.
- Swab in a container.
- Kidney basin or thermometer container.
- Blue pen.
- Watch with second hand.
- Graphic TPR chart.
- Paper bag.

Preparation of Patient

- Identify the patient and greet the patient
- Explain the whole procedure to the patient to obtained cooperation.
- Place the client in comfortable position
- Assess site for temperature measurement.

Procedure

- Hold the color-coded end of system glass thermometer with finger tips.
- If thermometer stored in disinfectant solution, rinse in cold water before using.
- Take swab and wipe thermometer bulb end towards fingers in rotating fashion. Dispose of tissue.
- Read mercury level while holding thermometer horizontally and gently rotating at eye level. If mercury is above desired level, grasp at the tip of thermometer securely and sharply flick wrist down ward. Continue shaking until reading is below 35.5°C.
- Position the patient with the axilla exposed.
- Gently pat the axilla dry with a facial tissue because moisture conducts heat. Avoid harsh rubbing, which generates heat.
- Ask the patient to reach across his chest and grasp his opposite shoulder and to lower his elbow and hold it against his chest. This promotes skin contact with the thermometer.
- Remove a mercury thermometer after 10 minutes; remove an electronic thermometer when it displays the maximum temperature. Auxiliary temperature takes longer to register than oral or rectal temperature because the thermometer is not closed in a body cavity.
- Do not allow clothing to come in contact with bulb of thermometer
- Grasp the end of the thermometer and remove it from the axilla.

After Care

Same as oral temperature recording.

Rectal Temperature

Purpose

Same as oral and axillary temperature recording in addition to following purposes.

- Recording a rectal temperature is often done to get the most accurate reading, especially in situations where precision is critical.
- Rectal temperature is preferred more accurate reliable or practical for infants and young children.

Preparation of Articles

- Choose the right thermometer for rectal use. Digital thermometers are commonly used for this purpose. Rectal mercury thermometer can be chosen.
- Swab in a container.
- Water-based lubricant (petroleum jelly).
- Kidney basin or thermometer container.
- Blue pen.
- Watch with second hand.
- Graphic TPR chart.
- Paper bag.

Measuring of Rectal Temperature (Fig. 6.8)

Preparation of Patient

- Identify the patient and assess the need for temperature monitoring.

JAYPEE BROTHERS

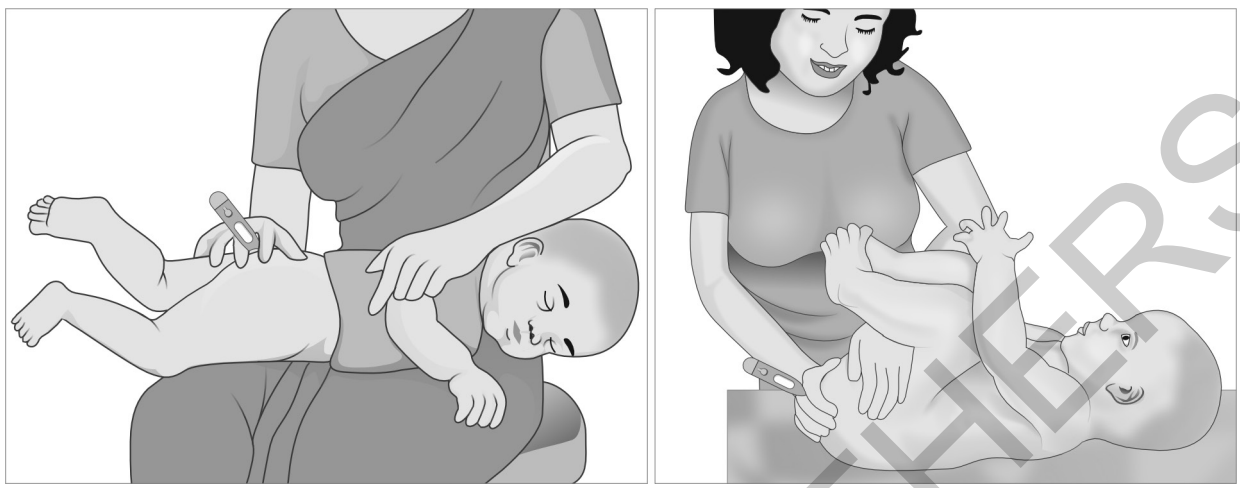

Fig. 6.8: Measuring of rectal temperature.

- Generally rectal temperature has been recorded for critically patient or for small children. So, the need of procedure explanation is for their caretaker to obtain cooperation.
- Place the client inside lying position/Sim's position with proper leg flexed for adult and for children, the preferred position is often on their back with their legs bent toward their chest.
- Maintain privacy by drawing curtain around bed or close room door.
- Assess site for its suitableness to record temperature.
- Move aside bed linen to expose only anal area. Keep clients upper body and lower extremities covered with sheet or blanket.

Procedure

- Wash hands.
- Apply disposable gloves.
- Hold digital thermometers or end of rectal glass thermometer with finger tips.
- Clean the thermometer by alcohol wipes or soapy water and rinse it before use to ensure hygiene.
- Read mercury level while gently rotating thermometer at eye level. Grasp tip of thermometer securely. Continue shaking until reading is below 35.5°C or 95.9°F.
- Apply a small amount of water-based lubricant (like petroleum jelly) to the thermometer tip to ease insertion and reduce discomfort.
- Squeeze little amount of lubricant on anal tissues. Insert thermometer blunt end into the anus 2.5 to 3.5 cm for adults.
- If resistance is felt during inserting, withdraw thermometer immediately. Never force thermometer.
- Hold thermometer in place, after the thermometer beeps, carefully remove it if mercury thermometer hold it for at least one minute or according to agency policy.
- Carefully remove thermometer and wipe off any remaining secretions with clean tissue/wipe in rotating fashion from fingers towards bulb. Dispose tissues in appropriate container.
- Read thermometer at eye level. Gently rotate until scale appears.

After Care

- Wipe client anal area with soft tissue to remove lubricant or feces and discard tissues. Assist client in resuming a comfortable position.
- Wash it with soap and water, and disinfect it with alcohol wipes before storing.
- Store thermometer in appropriate storage container.
- For disposable thermometers dispose of them according to hospital policy.
- Remove and dispose of gloves in appropriate container
- Wash hands.
- Record the temperature.

TYPES OF THERMOMETER (FIG. 6.9)

- **Mercury thermometer/clinical thermometer:** Mercury thermometer or clinical thermometer is an instrument used for measuring temperature of bodily heat or cold in which the mercury remains stationary at registration point until shaken down. This is a special instrument designed to measure the temperature of

JAYPEE BROTHERS

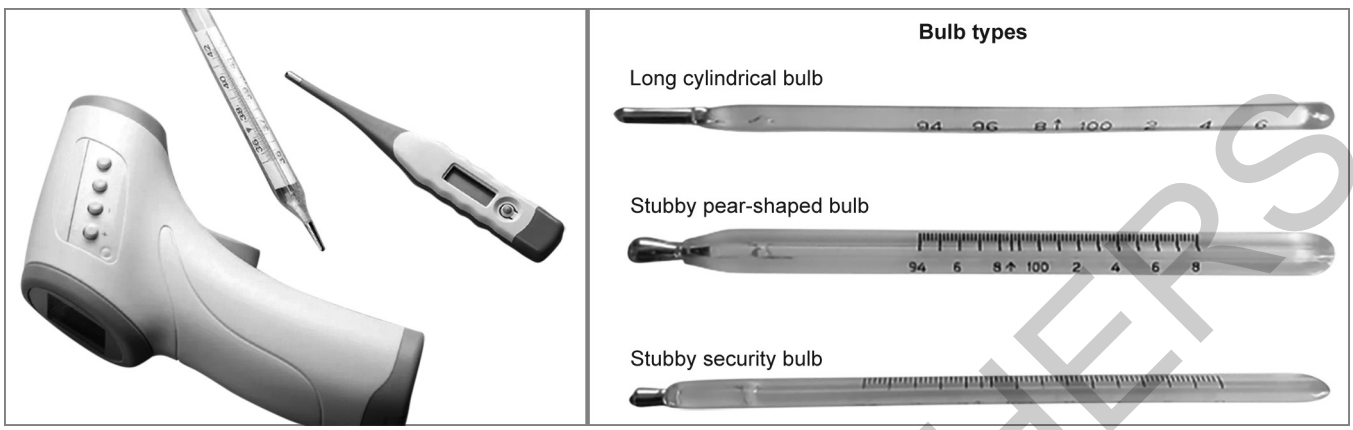

Fig. 6.9: Types of thermometer.

the body. It is available in both Fahrenheit and Celsius (centigrade) scales. The thermometer has two parts, a bulb containing mercury and a stem in which the mercury can rise. On the stem is a graduated scale representing the degree of temperature, the lowest registered being 35°C or 95°F. The highest being 43.3°C or 110°F, because the body temperature above or below these points are rare. Previously this thermometer was used by every healthcare setup but nowadays digital thermometers has replaced mercury thermometer. The mercury thermometer can be classified based on the bulb types. Long cylindrical bulb type can be used for oral temperature. For measuring rectal temperature the stubby bulb type thermometer will be used.

- **Electronic thermometer:** It consists of a battery powered display unit, a thin wire cord and a temperature sensitive probe covered by a disposable plastic sheath to prevent transmission of infection separate probes are available for oral and rectal insertion. These thermometers provide reading in less than 60 seconds. They offer a convenient, safe, accurate and fast method for measuring temperature. The reading is quickly displayed on the unit and is easy to read. Typically, the unit beeps when the measurement is complete. An electronic thermometer can be used for oral, axillary or rectal temperature measurements and it can be used with multiple clients.
- **Tympanic membrane thermometer:** It is a portable, hand held device, resembling an otoscope that recharges using a battery pack. It records temperature using a sensor probe that is placed in the ear canal to detect infrared radiation from the ear drum. The tympanic membrane thermometer is especially appropriate for infants over 2 months or very young children who may find it difficult to remain still, when other methods are used. This is also useful in departments where quick assessment is necessary, such as emergency/casualty departments since the recording is available in 2 seconds. It should not be used in clients who have ear drainage or scarred tympanic membranes.
- **Forehead thermometers:** Measure temperature from the surface of the forehead. They are non-invasive and quick, making them popular for use in clinics and at home. They work by detecting the infrared radiation emitted from the skin's surface. Recently during the COVID times, the temporal artery thermometers or digital forehead thermometers have been in use widely. They detect the precise temperature in less than 10 seconds, are convenient to use on a complete family, and can even be used on toddlers while they are asleep.
- **Disposable thermometer:** It is a single use thermometer, made of thin plastic strips with chemically impregnated paper, they are used for children to take oral and auxiliary temperature only 45 seconds are needed to record the temperature it is less accurate.

Scales of Thermometer

Clinical thermometers are used to measure the body temperature of human beings. Since they are used for measuring the body temperature of human beings, i.e., their temperature range is not broad. Such thermometers are sensitive to small temperature changes also. In clinical thermometer, there are two range of scale centigrade/celsius scale and Fahrenheit scale. Each scale provides temperature readings, and the choice of scale can depend on regional practices and user preference. Here is how these scales are typically represented and used in clinical thermometers:

- **Centigrade/Celsius scale:** A clinical thermometer's temperature ranges from 35 to 42°C or centigrade. In Celsius scale, normal body temperature ranges from

JAYPEE BROTHERS

about 36.5°C to 37.5°C. Generally, a temperature above 37.5°C is considered a fever. The thermometer will have a graduated scale with markings, often in increments of 0.1°C for precise measurement. In general, the clinical thermometers are designed with both Celsius and Fahrenheit scales on the same device but some of the device has only centigrade scale.

- **Fahrenheit scale:** In a clinical thermometer's temperature in Fahrenheit scale ranges from 94°F to 108°F. In Fahrenheit scale normal body temperature typically ranges from about 97.7°F to 99.5°F. A temperature above 99.5°F is usually considered a fever. The temperature can be converted from Fahrenheit to Celsius or Celsius to Fahrenheit by using following formula:

To convert fahrenheit to celsius:

$$C = 59(F - 32)C = \frac{5}{9}(F - 32)C=95(F – 32)$$

To convert celsius to fahrenheit:

$$F = 95C + 32F = \frac{9}{5}C + 32F=59C + 32$$

Parts of Mercury Thermometer (Fig. 6.10)

- A bulb contains mercury and in a stem, mercury rises. There is graduated scale on the stem, which represents the degree of temperature.
- The bulbs are of different size and shapes. The oral thermometers are with along and slender bulbs. The rectal thermometers are with short and fat bulbs.
- The stem has a curved surface which magnifies the lines and figures on the scale. The stem has a flattened back with a sharp ridge that makes it easier to read the scale. The flat surface prevents rolling.

Reason for Mercury Used in the Thermometer

- Very sensitive to small changes in temperature.
- Silver appearance helps in easy visible.

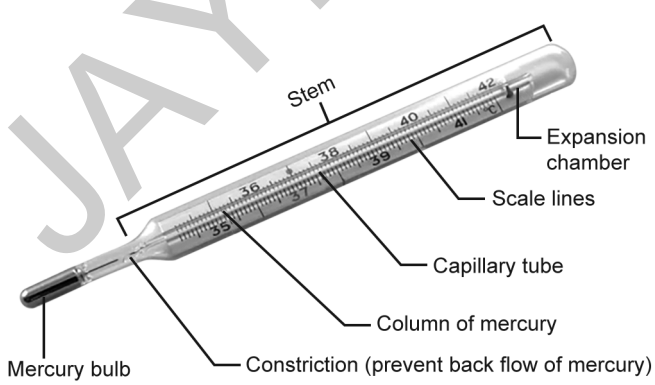

Fig. 6.10: Parts of mercury thermometer.

- Its boiling point is 357°C and freezing point is –39°C.
- The expansion of mercury is uniform.
- Mercury is 13.5 times heavier than water, so small glass tube can be used.

Care of Mercury Thermometer

- Shake the mercury down, grasp the thermometer securely by the upper end of the stem and never hold it by the bulb. Shake it down by the quick movement of the wrist.
- Be careful not to let the thermometer fall or strike against anything. Move away from the articles before shaking the thermometers.
- The thermometers are never washed with hot water, because the heat expands the mercury beyond the capacity of the stem and the thermometer can break.
- When storing the thermometers, never store them in disinfectant solution. Rinse them in clean water, dry the bulb and stem and put them in their containers with the bulb down resting on a smooth surface (cotton).
- For fear of breaking thermometers, never place the thermometer in the mouth of a person who cannot understand the instructions, or who is not able to hold the thermometer in place. The thermometers used in common should be washed with and water and disinfected with soap.

FEVER (PYREXIA)

Fever or pyrexia is defined as a rise in the body temperature above 99°F (37.2°C). The causes of fever are infections, diseases of the nervous system, certain malignant neoplasms blood diseases, such as leukemia, embolism and thrombosis, heat stroke from exposure hot environments, dehydration, surgical trauma and crushing injuries, skin abnormalities that interfere with heat loss, allergic reactions foreign proteins and pyrogens, etc. In fever, all the systems of the body are affected. It may vary with the nature of the disease.

- **Alimentary system:** Dry mouth, coated tongue, types of fever loss of appetite, indigestion, nausea, vomiting, diarrhea or constipation.
- **Urinary system:** Diminished urinary output, burning micturition, high colored urine.
- **Nervous system:** Headache, restlessness, irritability, insomnia, convulsions, delirium.
- **Musculoskeletal system:** Malaise, fatigue, body of pain, joint pain.
- **Integumentary system:** Heavy sweating, hot flushes, goose flush, shivering or rigors.

JAYPEE BROTHERS

for detailed information on nursing books, visit our website www.ejaypee.com, for detailed information on nursing books, visit our website www.ejaypee.com, for detailed information on nursing books, visit our website www

Textbook of
Nursing Foundation-I

Salient Features

- The book is strictly prepared according to the revised syllabus prescribed by the Indian Nursing Council (INC).
- It comprises 14 comprehensive chapters covering all fundamental concepts required for first-semester BSc Nursing students.
- It is written in simple, clear, and easily understandable language to support beginner-level learners.
- Nursing procedures are presented in a systematic, step-by-step format to develop psychomotor skills and clinical competence.
- It is enriched with adequate diagrams, tables, flowcharts, and mnemonics to enhance conceptual clarity and quick revision.
- Each chapter begins with learning objectives and concludes with a concise summary, multiple choice questions (MCQs), and answer keys for effective self-assessment.
- Organized content presentation ensures better understanding, retention, and academic success.

Bijayalaskhmi Dash PhD MSc (N) is a distinguished academician and researcher currently serving as an Associate Professor, Government College of Nursing, Berhampur, Odisha, India. She earned her Doctorate from Utkal University, Bhubaneswar, marking a career defined by clinical rigor and academic excellence. A prolific contributor to nursing literature, Dr Dash has authored four comprehensive textbooks specifically designed for BSc and MSc Nursing students, alongside a specialized competitive examination guide for Indian recruitment and a postgraduate logbook. Her extensive research portfolio includes 37 published articles in national and international journals and 19 research paper presentations at global forums. Beyond the classroom, Dr Dash is a prominent leader in the nursing community, currently serving as the President of the Nursing Teachers Association India (NTAI), Odisha branch, and as an Associate Editor for two nursing journals. A lifetime member of elite organizations such as TNAI, NRSI, NTAI, NSS, PHAI, and SOMI, she has been the recipient of numerous awards for her excellence in research, community development, and professional mentorship.

Sangeeta Kumari Mishra MSc (N) is a highly accomplished nursing professional and academician with over 18 years of dedicated experience in clinical practice and nursing education. She earned her Master's in Community Health Nursing in 2018 and was honored with a Gold Medal from Berhampur University, Odisha, for her outstanding academic achievement. From 2019 to 2024, she served at the Government College of Nursing, Berhampur, where she guided undergraduate students and fostered a culture of excellence, compassion, and ethical practice. A committed researcher, she has published two scholarly papers and presented at national seminars. Currently serving as a Nursing Officer at MKCG Medical College and Hospital, Berhampur, Odisha, India. She remains devoted to advancing evidence-based practice and delivering high-quality patient care.

Scan for more nursing titles...

Buy from ejaypee

JAYPEE BROTHERS

ISBN 978-93-6616-974-3

9 789366 169743