

FUNDAMENTALS LESSON 2

VITAL SIGNS

Assessing and monitoring a client's clinical condition is the main reason nursing care is required. Nursing decisions are based on assessment data. One of the most frequent data collection interventions a nurse performs is taking **vital signs**. These signs are also called **Cardinal Signs**.

Definition

Vital signs are signs that reflect the body's physiologic status. These measurements indicate the physiological functioning of the circulatory, respiratory, neural, and endocrine systems. They provide information critical to evaluating homeostatic balance of the body.

These vital signs include temperature, pulse, respiration and blood pressure. However, oxygen saturation, weight, and pain are also included in practice by most hospitals today.

These signs are called vital because the information collected usually provides the clearest indicator of an individual's overall health status.

Purpose of vital signs

1. To obtain base line data about the patients' health condition. Baseline values establish the normal against which subsequent measurements can be compared
2. To aid in diagnosing patient condition (diagnostic purpose)
3. To guide decision making in therapeutic interventions

Guidelines for Monitoring vital signs

1. Prepare your equipment. The first thing to do is to set your trolley/tray by adding the necessary equipment and materials including the following
 - Stethoscope
 - Sphygmomanometer
 - Thermometer (glasses, electronic and tympanic)
 - Second hand watch
 - Red and blue pen, Pencil

- Vital sign sheet
 - Cotton swab in bowel
 - 75% Alcohol
 - Disposable gloves if available
 - Receiver or plastic kidney dish
 - Alcohol base hand gel
2. Check that the all instruments are in a good state
 3. Always introduce yourself and explain the procedure to your patient
 4. Ensure that your patient is at rest or has rested for at least 5 to 30minutes after any physical exercise including eating
 5. Recall the normal vital signs ranges expected for your patient per age, sex, race etc. before you begin
 6. Remind yourself of the policy regarding vital signs in that hospital
 7. Sanitize or wash hands before and after each contact with a new patient
 8. Report abnormal vital signs and follow-up that appropriate corrective actions are done
 9. Disassemble your tray, clean it alongside reusable equipment
 10. File the vital sign sheets where appropriate

When to assess vital signs

1. At first contact with the patient or upon admission
2. As a routine procedure in the hospital where the frequency of measurements for the hospitalized client is determined by
 - ✓ The client's health status,
 - ✓ A nursing or medical order
 - ✓ Hospital /other health institution policy
3. When a client has a change in health status or reports symptoms such as chest pain or fainting regardless of the setting
4. Before and after the administration of certain medications that could affect the respiratory and Cardio Vascular System
5. Before and after surgery or an invasive diagnostic procedure
6. Before and after any nursing intervention that could affect the vital signs. E.g. Ambulation

Body Temperature

Temperature is the measurement of the hotness or coldness of the body. That is the balance of heat production and heat lost by the body.

Thermoregulation is the body's physiological function of heat regulation to maintain a constant internal body temperature.

The heat of the body is measured in units called **degrees Fahrenheit or centigrade**. There are two kinds of body temperature

1. Core Temperature

- ✓ Temperature of the deep tissues of the body, such as the cranium, thorax, abdominal cavity, and pelvic cavity
- ✓ Which remains relatively constant and
- ✓ It is the temperature that is measured with the thermometer
- ✓ The core temperature of **98.6°F** or **37°C** does not vary more than **1.4°F (0.77°C)** and is higher than the skin and external temperatures

2. Surface Temperature

- ✓ Temperature of the skin, the subcutaneous tissue and fat
- ✓ In contrast with core temperature, skin temperature rises and falls in accordance with changes in environmental temperature

Normal Temperature

Normal body temperature ranges from **36 °C to 37.2 °C** or **96.8 °F to 99 °F** with an average of **37 °C or 98.6 °F**

Conversion Table

Celsius to Fahrenheit	Fahrenheit to Celsius
(Temp in °C x 9/5) + 32	(Temp in °F – 32) x 5/9

Physiology and Regulation of Body Temperature

Heat production

Heat is produced in the body's cells through food metabolism that results in the release of energy. One form of this energy is thermal energy for regulation of body temperature. This thermal energy measured as heat liberation is usually expressed as the metabolic rate and measured as the basal metabolic rate, or BMR. BMR is the rate of energy use in the body and needed to maintain essential activities. The thermoregulatory center of the body is called **the hypothalamus** specifically the **anterior hypothalamic nucleus and the neurons of the preoptic hypothalamus**.

Body temperature is controlled by balancing metabolic heat production with heat loss. Most heat production comes from the deep tissue organs (brain, liver, and heart) and the skeletal muscles. However, the skin, subcutaneous tissues, and fat of the subcutaneous tissues serve as heat insulators for the body. Sweat glands in the dermis regulate sweating

When body heat rises, the hypothalamus transmits impulses to reduce body heat by triggering

- Perspiration (sweating)
- Vasodilation (the widening of blood vessels), and
- The inhibition of heat production.

The opposite physiological functioning occurs in response to a decrease in body heat. In this situation the impulses from the hypothalamus stimulate heat production through

- Vasoconstriction (the narrowing of blood vessels),
- Muscle shivering, and
- Piloerection (hairs standing)

Heat Loss

- Most body heat is lost from the skin's surface to the environment by the processes of **radiation, conduction, convection, and evaporation**
- **Insensible heat loss** is the heat that is lost through the continuous, unnoticed water loss that occurs with vaporization, accounting for 10% of basal heat production.
- Evaporation accounts for the greatest heat loss when body heat increases

Behavioral control of body temperature

Aside the heat production and heat loss mechanisms above, behavioral control mechanism of the body in response to the body signaling either overheated or too cold, everyone person makes appropriate

environmental adjustments to reestablish comfort including drinking hot tea, reducing clothing etc. to control body temperature.

Key terms in temperature monitoring

- **Fever** means high temperature. A client who has fever is referred to as **febrile**; the one with no fever is called **afebrile**
- **Pyrexia:** a body temperature above the normal ranges **38 °C to 41°C**. Above **42 °C** leads to death.
- **Hyper pyrexia:** a very high fever, such as **41°C**
- **Hypothermia:** body temperature between **34°C to 35°C**. Temperatures below **35°C** is death

Temperature Ranges

Oral Temperature: 36 to 38°C

Rectal temperature: usually 0.5°C higher than tympanic temperature

Axillary temperature usually 0.5°C lower than oral and tympanic temperature

Temporal temperature is closer to rectal, but about 0.5 higher than oral and 1°C higher than axillary temperature

NB: The first usual temperature for an individual always serve as the baseline for comparison

Common Types of Fevers

1. **Intermittent fever:** the body temperature alternates at regular intervals between periods of fever and periods of normal or subnormal temperature.
2. **Remittent fever:** a wide range of temperature fluctuation (more than **2°C**) occurs over the 24-hour period, all of which are above normal
3. **Relapsing fever:** short febrile periods of a few days are interspersed with periods of 1 or 2 days of normal temperature.
4. **Constant fever:** the body temperature fluctuates minimally but always remains above normal

Factors Affecting Body Temperature

1. **Age:** New-borns: due to a large surface to mass ratio, new-borns turn to loss heat rapidly to the environment. The normal temperature of a new-born should be between 36.5°C to 37.5°C. while for older adults they amount of subcutaneous fatty tissue is greatly reduced making them feel cold most often. Their average body temperature is 36°C. older persons are likely to experience drastic temperature changes related to weather conditions (environmental temperature) and the thermometer usually delays to read.
2. Hormonal changes may also influence temperature of the body. For example, body temperature rises slightly during ovulation and menses. Also in menopause, intermittent body temperature can increase by up to 4°C
3. Illness and injury. Fever is a physiologic response of the body to infection and inflammation. Fever causes an increase in the body's immune response by:
 - a) Increasing WBC production
 - b) Decrease plasma iron concentration to reduce bacteria growth
 - c) Stimulating interferon to suppress virus production
4. Recent food or fluid intake and smoking can influence oral and body temperature
5. Circadian rhythm, stress and environmental conditions can also affect body temperature

Monitoring Temperature

Site	Method	Precaution
Oral	Gently place the thermometer under the tongue in the posterior sublingual pocket lateral to the centre of the lower jaw	Use this site only for clients $\geq$ 4years Do not use this site for clients breathing via the mouth or with facial or mouth trauma
Rectal	Place patient in sim's position to expose the anus Ask client to breathe slowly and relax while you insert the lubricated thermometer Clean the anus when done	Do not use for clients with diarrhoea, or bleeding disorders

	Most preferred site for elderly and new-borns	
Auxiliary	Place the probe in the centre of the clients dry and clean axilla then lower the arm over the probe Keep the arm in this position for 3 to 5 minutes to read	Avoid wet axilla
Tympanic	Pull the ear up and back for adult or down and back for children Place thermometer slowly into the client's outer ear canal and press the scan button Leave it in place until a signal sound is heard	Avoid this for infants and children
Temporal	Clean the lens of the scanning device using alcohol While pressing the scan button, hold the probe flat against the forehead while moving it gently across the forehead over the temporal artery and then touch skin the earlobe	Use disposable probe covers or clean the probe with a disinfectant wipe between clients

NURSING INTERVENTION DURING HYPERTHERMIA

1. Obtain specimen for culture (sputum, blood, urine)
2. Assess or check WBC count, sedimentation rates and electrolyte
3. Start antibiotics after collection of specimen
4. Provide fluids and ensure minimize activity
5. Provide cooling blankets or tepid sponge

6. Administer antipyretics except aspirin for children to avoid the Reye syndrome
7. Prevent shivering since it may increase energy demand
8. Reduce clothing
9. Promote heat loss by conduction and convection

NURSING INTERVENTION DURING HYOTHERMIA

1. Keep patient warm and provide warm fluids
2. Ensure continuous cardiac monitoring
3. Set a standby emergency resuscitation device according to hospital policy

PULSE

It is a wavelike contraction of blood felt over bony prominences on the body. This wave is created by the contraction of the left ventricle of the heart.

Pulse also called heart rate reflects the heart beat and is the same as rate of ventricular contractions of the heart in a healthy person.

However, this may differ in patients with certain cardiovascular diseases which makes the heartbeat and pulse rate to differ.

There are two types of pulses namely apical and peripheral pulse. Peripheral Pulse is a pulse located in the periphery of the body e.g. in the foot, and or neck while apical pulse (central pulse) is located at the apex of the heart. The difference between apical and radial pulse is called **pulse deficit**. Pulse is always expressed in **beats per minute (BPM)**.

physiologic response

1. Autonomic nervous system controls the heart rate,
2. Parasympathetic nervous system lowers heart rate,
3. Sympathetic nervous system raises the heart rate

DESCRIBING PULSE

- a. **Rate:** number of counts per minute you feel or hear the wavelike expansion. a pulse rate greater than the expected or greater than 100BPM is called **tachycardia** while a rate slower than expected or 60BPM is called **bradycardia**

- b. **Rhythm:** how regular the impulses are. a premature heartbeat or missed beat as in the case of cardiovascular diseases results in irregular interval between impulses and can indicate altered electrical activity of the heart. normal pulse rhythms are detected when there are at regular intervals. an irregular heart rhythm characterized by an irregular radial pulse is called a **dysrhythmia**
- c. **Amplitude (strength):** describe the volume of blood ejected against arterial walls when the heart contracts. In a healthy individual the amplitude is usually the same between two beats. This amplitude is measured on a scale from zero to four as explained below.

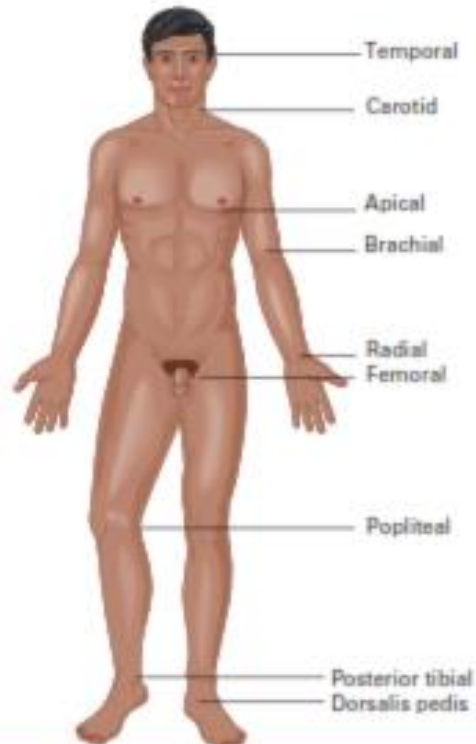
0	+1	+2	+3	+4
Absent/unable to palpate	Diminished or weaker than expected	Brisk, as expected	Increased, strong	Full volume, bounding

- d. **Equality:** peripheral pulse impulses should be similar in quantity and quality from left to right. inequality may indicate a disorder as in thrombus or aortic dissection.

Pulse Ranges per age

Normal Age-Related Variations in Resting Pulse		
AGE	NORMAL RANGE	AVERAGE RATE / MINUTE
Newborn	100–170	140
1 year	80–170	120
3 years	80–130	110
6 years	75–120	100
10 years	70–110	90
14 years	60–110	90
Adult	60–100	80

Pulse Points



Pulse can be monitored from various points namely

1. Superficial temporal
2. External maxillary
3. Carotid
4. Apical
5. Brachial
6. Ulnar
7. Radial
8. Femoral
9. Popliteal
10. Dorsalis pedis
11. Posterior tibial pedis

Factors Affecting Pulse Rates

1. **Age:** as age increase the pulse rate gradually decreases.
New born to 1 month: 130 BPM with a normal range of 80-180 BPM
Adult 80 BPM ranging from 60 – 100 BPM
2. **Sex:** after puberty the average males' pulse rate is slightly lower than that of females of the same age
3. **Exercise:** pulse rate increases with exercise
4. **Fever:** when fever occurs it increases pulse rate in response to the lowered blood pressure as a results of peripheral vasodilatation and increased metabolic rate
5. **Medications** like digitalis decreases pulse rate while others like epinephrine increases pulse rates
6. **Heat:** increase pulse rate as a compensatory mechanism
7. **Stress turns to** increase stimulation of the sympathetic nervous system which causes an increase in the rate and force of heart beat
8. **Position changes:** when a patient assumes a sitting or standing position blood usually pools in dependent vessels of the venous system. Pooling results in a transient decrease in the venous blood return to heart and subsequent decrease in blood pressure increases heart rate.

Factors leading to tachycardia	Factors leading to bradycardia
– Exercise – Fever, heat exposure – Medications – Changing from lying to sitting – Acute pain – Hyperthyroidism – Anaemia, hypoxemia – Stress, anxiety, fear – Hypovolemia, shock, heart failure, haemorrhage	– Hypothermia – Medications – Change of position from standing to sitting – Chronic or severe pain – Hypothyroidism – Relaxation

Procedure of Monitoring Pulse

Equipment: a watch or clock with a second hand

Procedure: perform hand hygiene and provide privacy. Locate the radial pulse, place the index and middle finger of one hand gently but firmly over the pulse. Assess the pulsation for rate, rhythm, amplitude and quality. Count for one minute and record. If irregular compare with opposite side and or apical pulse.

NURSING INTERVENTION

- a. Tachycardia
 - Monitor for pain, anxiety, restlessness, fatigue, low blood pressure and low oxygen saturation
 - monitor for potential adverse effects of medications
 - prevent injury
- b. bradycardia
 - Monitor for hypotension, chest pain, syncope, diaphoresis, dyspnoea and altered mental state
 - Monitor for drug adverse effects
 - Prevent injury

RESPIRATION

Respiration is the act of breathing that is, inspiration (intake of oxygen) expiration (removal of carbon dioxide) with a pause. Respiration can also be referred to as **Ventilation** which refer to the movement of air in and out of the lungs. When respiration occurs, the following can be observed

1. **External respiration:** refers to the exchange of oxygen and carbon dioxide between the alveoli of the lungs and the pulmonary blood system
2. **Internal respiration:** the exchange of oxygen and carbon dioxide between the circulating blood and cells throughout the body
3. **Inspiration (inhalation):** the intake of air into the lungs
4. **Expiration (exhalation):** the movement of gases from the lungs to the atmosphere

5. **Vital capacity:** the amount of air exhaled from the lungs after a minimal full inspiration

The five major physiological pulmonary functions that provide oxygen to the tissues and remove carbon dioxide are

1. **Ventilation:** the inflow and outflow of air between the atmosphere and the lung alveoli
2. **Circulation:** the quantity of blood flowing through the lungs is approximately 4 to 6 L/min
3. **Diffusion:** the exchange of oxygen and carbon dioxide between the alveoli and the blood
4. **Transport:** the carrying of oxygen and carbon dioxide in the blood and body fluids to and from the cells
5. **Regulation:** the neurogenic system adjusts the rate of alveolar ventilation to meet the demands of the body. The arterial blood oxygen pressure (PO_2) and arterial blood carbon dioxide pressure (PCO_2) may be altered during times of strenuous exercise and other types of respiratory stress.

Physiologically, the chemoreceptors in the carotid arteries and the aorta primarily monitor carbon dioxide levels of blood. Rising levels of CO_2 triggers the respiratory center of the brain to increase the respiratory rate. The increased respiratory rate helps to remove excess CO_2 from the body. However, for patients with chronic Obstructive Pulmonary Disease (COPD), a low oxygen level becomes the primary drive.

Two Types of Breathing

2. Diaphragmatic (abdominal): Involves the contraction and relaxation of the diaphragm, observed by the movement of abdomen. Commonly used for children.

1. Costal (thoracic): Involves the external muscles and other accessory muscles (sternocleidomastoid). Observed by the movement of the chest up ward and down ward. Commonly used for adults

Assessment

- The client should be at rest
- Assessed by watching the movement of the chest or abdomen.
- Accurate respiration involves observing the Rate, rhythm, depth and special characteristics of respiration per individual

A. Rate: is described in rate per minute (RPM) Healthy adult RR = 12- 20/ min. is measured for full minute. As the age decreases the respiratory rate increases.

1. Eupnea- normal breathing rate and depth
2. Bradypnea- slow respiration
3. Tachypnea - fast breathing
5. Apnea - temporary cessation of breathing

B. Rhythm: is the regularity (intervals) of expiration and inspiration. Normal breathing is automatic and effortless.

C. Depth: the amount of chest wall expansion that occurs with each breath. Altered depths are deep or shallow.

Deep: a large volume of air inhaled and exhaled, that inflates most of the lungs.

Shallow: exchange of a small volume of air minimal use of lung tissue.

Hyperventilation: very deep, rapid respiration

Hypoventilation: very shallow respiration

Normal Age-Related Variations in Resting Respiration		
AGE	NORMAL RANGE	AVERAGE RATE/MINUTE
Newborn	30-50	40
1 year	20-40	30
3 years	20-30	25
6 years	16-22	19
14 years	14-20	17
Adult	12-20	18

Factors affecting Respiratory Rate (RR)

1. **Age:** RR decreases with age.
2. **SEX:** Men and children are diaphragmatic breathers, and abdominal movements are more noticeable. Women use more thoracic muscles and chest movements are more pronounced when they breathe.
3. **Pain:** acute chest pain decreases the depth of respiration. However, the onset of acute body pain increases respiratory rate which become stable with time.
4. **Anxiety increases** rate and depth of respiration
5. **Smoking** causes the resting rest of respiration to increase
6. **Body position:** upright position allows full chest expansion and facilitate ventilation
7. **Medications** such as opioids, sedatives, bronchodilators and general anesthesia decreases respiratory rate and depth. Amphetamines and cocaine increases rate and depth of respiration.
8. **Neurological injury** to the brainstem decreases respiratory rate and rhythm.
9. **Illnesses** can affect shape of chest walls, change of patency passages etc. that may lead to decrease respiratory rates.
10. **Impaired oxygen carrying capacity** of the blood that occurs with anemia or high altitude results in increase in RR and alteration in rhythm as a compensatory mechanism.

Equipment: a watch that allows for counting in seconds

BLOOD PRESSURE

Both the blood pressure and pulse are measurements that determine the volume of ejected blood into the arterial system with each ventricular contraction.

Definition: Blood pressure is the measure or amount of force (pressure) exerted against the walls of arteries during systole and diastole. Its measuring unit is millimeters of mercury (mm Hg).

Blood pressure is a result of the cardiac output (CO) and peripheral /systemic vascular resistance (PVR/SVR)

$$\text{That is, } \mathbf{BP} = \mathbf{CO} \times \mathbf{SVR}$$

Where CO is determined by;

Heart rate, contractility, blood volume and venous return. Increase in any of these factors increases CO and consequently BP and vice versa.

On the other hand,

SVR reflects the amount of constriction or dilation of arteries, and the diameter of the blood vessels. Increase in SVR increases BP and vice versa.

Normal arteries expand during systole and contract during diastole, creating two distinct pressure phases:

Systolic blood pressure is a measurement of the maximal pressure exerted against arterial walls during systole (when myocardial fibers contract and tighten to eject blood from the ventricles), primarily a reflection of *cardiac output*.

Diastolic blood pressure is a measurement of pressure remaining in the arterial system during diastole (period of relaxation that reflects the pressure remaining in

the blood vessels after the heart has pumped), primarily a reflection of ***peripheral vascular resistance***

In a healthy young adult, the systolic pressure is less than 120 mm Hg, and the diastolic pressure is less than 80 mm Hg.

The pulse pressure is the difference between these pressures, which is 40 mm Hg.

Classification of Blood Pressure

Category	Systolic BP	Diastolic BP
Normal	< 120	< 80
Elevated	120-129	< 80
Stage 1 hypertension	130-139	80 - 89
Stage 2 hypertension	≥140	≥ 90

NB: These categories should not be based on BP reading at a single point in time but should be confirmed by two or more readings (averaged) made on at least two separate occasions. (John M. Flack & Bemil Adekola. 2020.

<https://doi.org/10.1016/j.tcm.2019.05.003>.

Physiology of Blood Pressure

The body has four hemodynamic regulators for blood pressure control:

1. Blood volume: the volume of blood in the circulatory system. Blood pressure is proportional to the blood volume. For example, hemorrhage causes a loss in blood volume that, in turn, lowers the blood pressure. Rapid infusion of intravenous fluids causes an increase in volume and a subsequent rise in pressure.
2. Cardiac output: the major factor that influences systolic pressure.
3. Peripheral vascular resistance: the size and distensibility of the arteries, which is the most important determinant of diastolic pressure. Arterial resistance (decreased distensibility) is encountered when the left ventricle pumps blood from the heart under pressure during the

systolic phase. The arteries contain smooth muscles that allow them to contract, which decreases their compliance (tone) and causes resistance. The varying degrees of tone allow some of the arterioles to remain constricted while others dilate to protect the body's circulatory system from accommodating a greater blood capacity than the actual blood volume. If all of the arterioles were to dilate at one time, there would not be enough blood to fill them.

4. Viscosity: the thickness of the blood based on the ratio of proteins and cells to the liquid portion of blood. The greater the viscosity, the harder the heart must work to pump blood, with a resultant increase in blood pressure.

These regulators work in unison to create a constant blood pressure. For instance, when the blood volume decreases, the body compensates with an increased heart rate and vasoconstriction that increases peripheral resistance to maintain normal pressure and functions of the vital organs. blood pressure readings provide significant clinical data relative to the client's cardiovascular and fluid volume status. An increase in blood pressure is called **hypertension** while a decrease is called **hypotension**.

Normal Age-Related Variations in Blood Pressure	
AGE	BLOOD PRESSURE (MM HG)
Newborn	Up to 70/45
5 years	Up to 115/75*
6 to 12 years	Up to 125/80*
13 to 15 years	Up to 126/78*
16 to 18 years	Up to 132/82*
Over 18 years	<120/80

Factors Affecting Blood Pressure

1. Fever	Increase
2. Stress	Increase
3. Arteriosclerosis	Increase
4. Obesity	Increase
5. Exposure to cold	Increase
6. Hemorrhage	Decrease
7. Low hematocrit	Decrease
8. External heat	Decrease
9. Medications	Decrease or Increase
10. Illness	Decrease or Increase

Sites for Measuring Blood Pressure

1. Upper arm using brachial artery (commonest)
2. Thigh around popliteal artery
3. Fore -arm using radial artery
4. Leg using posterior tibial or dorsal pedis

Methods of Measuring Blood Pressure

Blood pressure can be assessed ***directly*** or ***indirectly***

1. Direct (invasive monitoring) measurement involves the insertion of catheter in to the brachial, radial, or femoral artery. With use of correct placement, it is highly accurate.
2. Indirect (noninvasive methods)
 - a) The auscultatory
 - b) The palpatory.

When taking blood pressure using stethoscope, the nurse identifies five phases in series of sounds called Korotkoff's sound.

Phase 1: The pressure level at which the first joint clear tapping sound is heard, these sounds gradually become more intense. To ensure that they are not extraneous sounds, the nurse should identify at least two consecutive tapping sounds.

Phase 2: The period during deflation when the sound has a swishing quality

Phase 3: The period during which the sounds are crisper and more intense

Phase 4: The time when the sounds become muffled and have a soft blowing quality

Phase 5: The pressure level when the sounds disappear

Assessing Blood pressure

Purpose

1. To obtain base line measure of arterial blood pressure for subsequent evaluation
2. To determine the clients' hemodynamic status
3. To identify and monitor changes in blood pressure resulting from a disease process and medical therapy.

EQUIPMENT

- o Stethoscope
- o Blood pressure cuff of the appropriate size
- o Sphygmomanometer

Procedure

1. Prepare and position the patient appropriately
 - Make sure that the client has not smoked or ingested caffeine, within 30 minutes prior to measurement.
 - Position the patient in sitting position, unless otherwise specified. The arm should be slightly flexed with the palm of the hand facing up and the fore arm supported at heart level
 - Expose the upper arm

2. Wrap the deflated cuff evenly around the upper arm.
 - Apply the center of the bladder directly over the medial aspect of the arm. The bladder inside the cuff must be directly over the artery to be compressed if the reading to be accurate.
 - For adult, place the lower border of the cuff approximately 2 cm above antecubital space.
3. For initial examination, perform preliminary palpatory determination of systolic pressure
 - Palpate the brachial artery with the finger tips
 - Close the valve on the pump by turning the knob clockwise.
 - Pump up the cuff until you no longer feel the brachial pulse
 - Note the pressure on sphygmomanometer at which the pulse is no longer felt
 - Release the pressure completely in the cuff, and wait 1 to 2 minutes before making further measurement
4. Position the stethoscope appropriately
 - Insert the ear attachments of the stethoscope in your ears so that they tilt slightly fore ward.
 - Place the diaphragm of the stethoscope over the brachial pulse; hold the diaphragm with the thumb and index finger.
5. Auscultate the client's blood pressure
 - Pump up the cuff until the sphygmomanometer registers about 30 mm Hg above the point where the brachial pulse disappeared.
 - Release the valve on the cuff carefully so that the pressure decreases at the rate 2-3 mmHg per second.
 - As the pressure falls, identify the manometer reading at each of the five phases explained above
 - Deflate the cuff rapidly and completely
 - Repeat the above step once or twice as necessary to confirm the accuracy of the reading.
6. Remove the cuff from the client's arm
7. For initial determination, repeat the procedure on the client's other arm, there should be a difference of no more than 5 to 10 mmHg between the arms. The arm found to have the higher pressure, should be used for subsequent examinations
8. Document and report pertinent assessment data, report any significant change in client's blood pressure to the nurse in charge. Also report these finding:

- a) Systolic blood pressure (of adult) above 140 mmHg.
- b) Diastolic blood pressure (of an adult) above 90 mmHg
- c) Systolic blood pressure of (an adult) below 100mmHg

Other vital signs

Pain

Definition: it is classified as the fifth vital sign because it turns to reveal much about a person physical and mental health which turns to affect the quality of life.

It can be described as acute or chronic. Pain is generally assessed using a scale known as the pain scale from **zero** (meaning no pain, a smiling face) to **ten** (where the client experiences the worst pain possible and most often cries). However, the following must be noted when assessing pain

1. Location on the body
2. Kind of pain (dull, sharp, aching, throbbing, shooting, burning etc.
3. Onset (when it started)
4. What makes it worst
5. What reliefs it
6. How does it affect activities of daily leaving, sleep, work, mood, emotions etc.

Oxygen saturation

Definition: the fraction of oxygen-saturated hemoglobin relative to total hemoglobin in blood. It is measured as a percentage. Normal adult values range from 80 to 100%

Equipment: pulse oximeter

Rational: it gives the nurse an idea about the efficiency of the lung in ventilation and respiration

Weight and height

These two are basic measurement that determine the growth rate per age as well as nutritional status.

Readings of weight or height also guide the healthcare provider on issues about prescription and treatment options.

Study questions

1. Explain vital signs and list what it includes.
2. Identify important times to assess vital signs.
3. Mention some of the factors affecting body temperature.
4. What does pulse deficit mean?
5. Define arterial blood pressure.
6. Explain the two methods of assessing blood pressure.