

Vital Signs - 2021

Vital signs

- Temperature-T
- Pulse-P
- Respirations-R
- Blood Pressure-B/P.
- Pain as the 5th Vital Sign
- Oxygen Saturation (Pulse Ox or SpO2) measured @ same time

Vitals Signs

- Pay attention to results
- Look at all values together
- Keep in mind the client's current and past health history
- What is normal for them?
- What is normal for the facility?

Vital Signs Can:

- Identify an acute medical problem
- Quantify magnitude of illness & body's response to that stress
- Be a marker of chronic disease
- Reflect changes in body function that otherwise might not be observed

When Do I Assess Vital Signs?

- Per facility policy
- Per healthcare provider order
- Other times
 - Baseline (admission)
 - Change in health status or reports symptoms
 - Chest pain, feeling "faint"
 - Before or after surgery or invasive procedure
 - Before or after meds or treatments
 - Before or after nursing interventions that could affect VS

Blood Pressure

- Blood pressure is a measure of the pressure exerted by the blood as it flows thru the arteries
- Systolic pressure = Force of blood exerted against walls of arteries when ventricles contracting
- Diastolic Pressure = Force of blood exerted against walls of arteries when ventricles at rest
- Measured in millimeters of mercury (mmHg)
 - "Normal Adult" = less than 120/less than 80

Factors Affecting Blood Pressure

- Age
- Exercise
- Stress
- Gender
- Ethnicity
- Medications
- Obesity/Diet
- Diurnal Rhythm

- Temperature
- Family history

Complications

- Hypertension
 - BP persistently above normal
 - Present on two different occasions
 - Usually asymptomatic
- Hypotension
 - BP below expected range
 - SBP below 90 mmHg when normally higher
 - Can be symptomatic...or not
- Orthostatic Hypotension
 - BP drops with position change
 - Patient feels faint
 - Must change positions slowly
 - How to assess for this?
 - Obtain BP and HR in 3 different positions
 - Lie, Sit, Stand (in that order)
 - Drop in SBP > 20 mmHg or DBP > 10 mmHg with increase in HR by 10 - 20% = orthostatic hypotension

Equipment for Checking Blood Pressure

- Stethoscope
- Blood pressure cuff
- Sphygmomanometer
 - o Digital (automatic) manometer
 - Electronic readings
 - o Aneroid (manual) manometer
 - Calibrated dial with needle that points to readings

Equipment for Checking Blood Pressure

- Cuff Size
 - Bladder must be correct size
 - Width should be 40% of limb circumference
 - Bladder (inside the cuff) should wrap 80% around arm (or other limb) of adult

Assessing the Blood Pressure

- Sites
 - Usually brachial artery
 - Forearm, thigh & calf if needed
- Contraindications
 - Injury/trauma (including surgery)
 - Cast
 - Mastectomy or surgical removal of lymph nodes
 - IV site/PICC line
 - AV fistula

Measuring B/P at Brachial Site

- Support patient's arm at heart level
- Expose arm completely—no BP's over clothing
- Wrap cuff smoothly, snugly around arm
- Place center of bladder over brachial artery where base of cuff 1" above antecubital space (bend in elbow)
- Palpate brachial pulse, place stethoscope over artery
- Close valve on inflating bulb & squeeze rapidly to inflate cuff until reads 30mmHg higher than "usual" SBP
- Release air screw valve slowly and allow dial to fall gradually (2-3 mmHg/sec.)
- Listen for Korotkoff's sounds-- sounds heard due to obliteration and return of arterial blood flow. Record:
 - First sound = systolic
 - Last sound = diastolic

Korotkoff's Sounds

- Korotkoff's sounds are heard as blood begins to flow through artery
 - **Phase 1:** first faint clear tapping = systolic sound
 - **Phase 2:** Swishing, whooshing sound.
 - **Phase 3:** Crisper, more intense sound.
 - **Phase 4:** Distinct muffling sound.
 - **Phase 5:** Silence = diastolic sound
 - Continue to listen 10-20 mmHg below last sound to confirm your reading, then open cuff valve & completely deflate.

Common Errors in Assessing BP

- Hurrying by the nurse
- Subconscious bias
- Improper size cuff, wrapped too loosely
- Arm not at heart level
- Assessing immediately after activity
- Failure to identify auscultatory gap
- Listening over clothes
 - Improper environment (noise, pt. talking)
-

Body Temperature

- Reflects balance between heat produced & heat lost from the body
- Measured in degrees
- Two kinds
 - Core Temperature (deep tissues)
 - Remains relatively constant
 - Normal is a range (97-99 F or 36-37.5 C--oral)
 - Surface Temperature (shell)
 - Skin, subcutaneous tissue
 - Rises & falls in response to environment

Body Temperature

- Heat Balance
 - Amount of heat produced=Amount of heat lost

Factors Affecting Heat Production

- Basal Metabolic Rate (BMR)
- Muscle Activity

- Thyroxine output
- Testosterone
- Sympathetic stimulation/stress response

Factors Affecting Heat Loss

- As body produces heat, it also loses it through:
 - Radiation
 - Conduction
 - Convection
 - Evaporation

Factors Affecting Body Temperature

- Age
- Hormones
- Exercise
- Illness & Injury
- Food or fluid intake
- Smoking
- Circadian rhythms
- Stress
- Environment

Types of Thermometers (Equipment)

- Electronic
 - Use disposable probe cover
 - Measures oral, rectal or axillary temps
 - Color coded probes
 - Red-rectal, blue-oral
 - <60 seconds
- Tympanic
 - Ear canal (tympanic membrane)
- Temporal
 - Compares temp of temporal artery to temp of room
 - Expensive

Procedures for Taking a Temperature

- Oral
 - Advantages:
 - Accessible, convenient, relatively constant
 - Disadvantages:
 - Inaccurate after eating or smoking
 - Contraindicated:
 - Confused or agitated patients
 - Facial trauma
 - Mouth Breathers
- Rectal
 - Advantages:
 - Reliable
 - Disadvantages:

- Inconvenient, uncomfortable
- Contraindicated:
 - Diarrhea, rectal disease or surgery
- Axillary
 - Advantages:
 - Safe, noninvasive, good option for confused/agitated
 - Disadvantages:
 - Less accurate?
 - Contraindicated: None known.
- Tympanic
 - Advantages:
 - Fast, accurate
 - Disadvantages:
 - Presence of cerumen may affect
 - Can be uncomfortable
 - Contraindicated:
 - Injury to ear canal
 -
- Temporal
 - Advantages:
 - Safe, fast, noninvasive
 - Disadvantages:
 - Adjustments needed if sweat on forehead
 - Expensive
 - Contraindications: None known

Complications

- Fever
 - Normal range 97.0-99.0 F (36-37.5 C)
 - Temp above usual range = pyrexia or hyperthermia
 - Client with fever is “febrile”; without fever is “afebrile”
- Causes of elevated temperature
 - Pathogens (bacteria, fungi, virus)
 - Head injury (damage to hypothalamus)
 - Environmental exposures
 - Heat exhaustion & heat stroke

Alterations in Body Temperature

Hypothermia

- Core body temp below lower limit of normal
- Causes of depressed temperature
 - Excessive heat loss
 - Inadequate heat production to counteract loss
 - Impaired hypothalamic thermoregulation
 - May be accidental or induced

Pulse

- Pulse = wave of blood created by contraction of heart's left ventricle
- Can be noted at various points on the body
- Peripheral pulse
 - Located away from heart
- Apical pulse
 - Central pulse located at apex of heart
 - Also called the point of maximal impulse (PMI)

Assessing the Pulse

Rate: Number of beats per minute (bpm)

- For resting heart rate:
 - Adults: 60 to 100 bpm
 - Well-trained athletes; 40 to 60 bpm
- Bradycardia = HR less than 60
- Tachycardia = HR greater than 100

Rhythm: pattern of the beats

- Regular
- Irregular
 - Arrhythmia or dysrhythmia
- Check AP x 1 min

Pulse Strength (Amplitude)

- Volume of blood ejected with each heart contraction
- Ranges from absent to bounding
 - +0 Absent pulse
 - +1 Weak, thready
 - +2 Diminished
 - +3 Normal
 - +4 Bounding

Symmetry

- Compare on each side of body
 - If both the same, "bilaterally equal"

Consider This: Palpation of a peripheral pulse = presence of more proximal pulses

Factors Affecting the Pulse

- Age
- Exercise
- Fever
- Medications
- Hypovolemia
- Stress/Pain
- Position change

Pulse Sites

- Temporal

- Carotid
- Apical
- Brachial
- Radial
- Femoral
- Popliteal
- Posterior tibial
- Dorsalis pedis

Equipment for Checking the Pulse

- Watch with second hand
- Stethoscope
- Doppler -- For difficult to detect pulses

Respirations

- Body's mechanism for exchanging oxygen (O₂) & carbon dioxide (CO₂) b/t atmosphere and blood/cells of the body.
- Accomplished thru breathing
- Breathe in O₂
- Breathe out CO₂

Assessing Respirations

- Assess when pt. relaxed and not aware
- Before assessment be aware of:
 - Normal breathing pattern
 - Medications, therapies, or conditions that may affect breathing

Assessing Respirations

Rate

- Breaths per minute
- Normal = 12-20 per minute
 - 1 inspiration & 1 expiration = 1 breath
 - Slow-bradypnea
 - Fast-tachypnea
 - Absence-apnea

Depth

- Amount of chest wall expansion that occurs with each breath.
- Normal, deep, or shallow

Rhythm

- Breathing intervals
 - Regular or irregular
- Normally are evenly spaced
- Infants less regular than adults

Quality (Effort & Ease of Breathing)

- Unlabored or Labored?
- Quiet or noisy?

- Labored or noisy breathing is abnormal
- Indications of labored breathing
 - Dyspnea
 - Orthopnea

Assessing Respirations

- Goal of respirations?
- How do you know if respirations effective?

Pulse Oximetry

- Noninvasive, indirect measurement of O₂ saturation (SpO₂) of the blood
- Provides digital reading of pulse rate & SpO₂
- Normal SpO₂ = 95-100%
 - Keep above 90% at a minimum, unless client has known underlying illness (i.e. COPD)

Factors Affecting the Respiratory Rate

- Exercise
- Stress (crying, anxiety)
- Pain
- Smoking
- Body position
- Medications
- Higher altitude
- Anemia
- Sleep

Factors Affecting SpO₂ (oxygen saturation)

- Low hemoglobin
- Circulation
- Activity
- Carbon monoxide
- Dark nail polish

Recording & Reporting

- Document in client record on electronic medical record (EMR)
 - Indicate appropriate route for temp, pulse, and BP
- Relate results to patient situation
- Conduct appropriate follow-up
 - Notify instructor first and then RN
 - Give medication or treatment as ordered
- Conduct appropriate follow-up based on interventions



You were born
with the ability to
change someone's
life, don't waste it.

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