Vital Signs

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Headings to Objectives

- A. Discuss the significance of vital signs in relation to health status.
- B. Discusses the key elements related to body temperature.
- C. Discusses the key elements related to pulse.
- D. Discusses key elements regarding respirations.
- E. Discusses key elements related to blood pressure.

What is "Vital Signs"?

- Measures of various physiological statistics in order to assess the most basic body functions
- Age
- "Signs that are necessary to life."
- They reflect changes in a person's status.

What are the traditional VS?

- Temperature
- Pulse
- Respirations
- Blood pressure
- Oxygen saturation (not a 6th vs. but commonly measured at this time)
- Pain

Select the reasons why VS have to be taken? (Select all that apply)

a. To follow hospital protocol
b. It is a nursing responsibility
c. Obtain baseline
d. client requested for VS check
e. Protect my license

Nurse's roles R/T VS

- Monitoring
- Collaborating
- client teaching

"His vital signs are fine. That means his insurance just ran out."

Guidelines for Obtaining Accurate VS

- Equipment
- ID clients
- Ranges
- Wash hands
- Position
- Environment
- Any abnormality, repeat
- Affect of other factors

Temperature

ARE YOU ABSOLUTELY POSITIVE YOU HAVE NO SUN-BLOCK?

Body Temperature

- Reflects the balance between heat produced and heat lost
- Two kinds of body temperature
  - Core
  - Surface
- Normal ranges →96.8-99.5 ° F/36 °C -37.5 °C
- Different routes

Body Temperature Regulations

"

The Hypothalamus= the thermostat

Anterior → Heat loss

Posterior → Heat production

Factors that affect Temperature

Anterior hypothalamus

Heat loss

- Radiation
- Conduction
- Convection
- Evaporation
- Diaphoresis

Posterior hypothalamus

Heat production

- Basal Metabolic Rate
- Muscle activity
- Thyroxine and epinephrine
- Fever

Types of thermometers

–electronic
–chemical
–temperature sensitive tape
–infrared thermometers

Pros and cons of various routes

- Oral
- Rectal
- Axillary
- Tympanic
- Temporal artery

Pg. 481, Table 29.1

Nursing Interventions

- What questions should you ask prior to selecting a route?
- What are your nursing interventions?

Alterations in Body Temperature

The story of Fever: "A change in the thermostat set point"

- Onset: Chill Phase
- Course: Plateau Phase
- Defervescence: Febrile Abatement/Flush Phase

Formulas

- To convert from Fahrenheit to Celsius

C = (Fahrenheit temp. -32) X 5/9

Ex: Fahrenheit is 100

C= (100-32)= 68X 5/9=37.8 °C

To convert from Celsius to Fahrenheit

F = (Celsius temp. X 9/5) + 32

EX: Celsius is 40

F =(40 X 9/5) + 32 =(72 + 32)= 104°F

Berman, pg. 483

What are the pros and cons of fever?

Nursing care for febrile clients

- Monitor parameters
- Measures to lower temp
- Provision of comfort
- Prevent complications

(Berman, p. 481)

Heat stroke vs Heat exhaustion

What is your nursing intervention?

Anticipate what the VS will be

Which is more life threatening?
Provide a rationale for your answer.

Hypothermia

- **Two types**
  - Intentional (induced)
  - Unintentional (accidental)
  - Nursing care focus

Pulse

Pulse

- Wave of blood created by contraction
- Pulse wave represents the stroke volume output
- Pulse rate X SV = CO (cardiac output)

Ex: SV 65mL X 70 beats=4.55L/min

Identify the sites where pulses are assessed.

Factors affecting Pulse

- Age
- Gender
- Exercise
- Fever
- Medications
- Hypovolemia
- Stress
- Position changes
- Pathology

"You've been working too hard.
Instead of a heart beat, I'm getting a fax tone."

Alterations in Pulse

"Sounds good. No, wait – that's my iPod."

- Pulse deficit
- Tachycardia
- Bradycardia
- Dysrhythmias

Pulse assessment and Nursing responsibility

Method of assessment	Nursing responsibility
• Palpation	• Rate • Rhythm
• Auscultation	• Volume • Elasticity
• Doppler	• Presence • Absence
• Pulse volume	• Bilateral equality

Respiration

Respiration

- Act of breathing
- Cycle of inspiration and expiration X 1 min.
- Controlled by respiratory centers in the brain and chemoreceptors

Factors affecting Respiration

- Exercise
- Stress
- Environmental temperature
- Oxygen concentration
- Certain medications
- Increased ICP

Alterations in Respiration

- Tachypnea
- Bradypnea
- Apnea
- Dyspnea vs. Orthopnea
- Hyperventilation vs. Hypoventilation
- Cheyne-Stokes breathing

Berman, pg. 498, Box 29-5

Respiratory assessment and Nursing responsibility

Assessment
- Rate
- Rhythm
- Depth
- Quality

- Nursing responsibility
- Breathing pattern
- Health problem(s)
- Medications
- Cardiovascular function

Blood Pressure

Blood Pressure

- Arterial blood pressure – measure of the pressure exerted by the blood as it flows through the arteries.

"When did you last have your pressure checked?"

Blood Pressure

- Systolic – peak pressure
- Diastolic- minimum pressure
- Pulse pressure

Blood pressure, cont.

- Korotkoff's sound
  - 5 phases in the series of sounds heard

(Berman, 10th ed., pg. 503, Figure 29-23)

- Auscultatory gap
  - temporary disappearance of sounds

What is the normal BP?

Category	SBP mmHg mmHg		DBP
Normal	<120	and	<80
Prehypertension	120-139	or	80-89
Hypertension, Stage 1	140-159	or	90-99
Hypertension, Stage 2	≥160	or	≥100

(US DHS, 2007)

Determinants of BP

- Cardiac output-
  - Pulse rate X Stroke volume = CO
- Peripheral vascular resistance (PVR)
  - Arteriosclerosis
- Blood volume
- Blood viscosity
  - Hematocrit

Factors affecting BP

- **Age**
- **Exercise**
- **Stress**
- **Race**
- **Gender**
- **Medications**
- **Diet, obesity**
- **Alcohol**
- **Temperature**
- **Diurnal variations**
- **Disease process(es)**
- **Cigarette smoking**

Alterations in BP

- Hypotension
- Orthostatic hypotension
- Hypertension
  - Primary HTN
  - Secondary HTN

BP assessment and Nursing responsibility

Assessment

- of equipment
- of clients upper arm
- Measured
  - Directly or
  - Indirectly

Nursing responsibility

- Intervene according to cause of
  - Hypotension
  - Orthostatic hypotension
  - Hypertension

How to assess orthostatic hypotension?

- Place pt. in supine position for 10 mins.
- Record the BP and PR
- Assist the pt. to slowly sit or stand
- Immediately recheck the BP and PR
- After 3 mins., recheck the BP and PR
- Record the results; positive results mean:
  - **SBP ↓20mmHg or DBP ↓10mmHg**
  - **PR ↑15 to 30 BPM**

Contraindications for obtaining BP on a specific limb

- Mastectomy side of the arm
- Hemodialysis shunt/fistula
- Injuries, cast
- On-going IV infusion or blood transfusion
- Specific doctor's order
  - pre and post op
  - No BP or blood draw in left arm

What are the common errors in BP assessment?

- Technique
- Equipment
- client-relate factors

Oxygen Saturation

- **Pulse oximeter** is a noninvasive device that estimates a client's arterial blood oxygen saturation

- Normal SaO_2

Factors affecting O_2 Saturation

- Hemoglobin
- Circulation
- Activity

Case Study

Mr. DB presents with a productive cough and high fever.

- Brought by his wife to the emergency room
- Long-term chronic alcoholic
- Combative and confused
- Cough productive of bloody sputum

Physical exam reveals:

- Temperature of 39.3°C
- Labored breathing with respirations of 34/min.
- O2Sat 89% on room air
- Rales and ronchi over central portion of right lung field.
- Decreased breath sounds over central portion of right lung field.
- Dullness to percussion over central and lower portion of right chest.

Case Study

The doctor orders:

- CBC
- Chest X-Ray
- Sputum for gram stain and culture
- His bloody sputum sample is to the right.

Case Study, *cont.*

Complete Blood Count

WBC (thousands/uL)	24.8	(3.5-11.5)
Neut	82%	(44-88)
Bands	9%	(0)
Lymph	6%	(12-43)
Mono	2%	(2-11)
Eos	1%	(0-5)
RBC (million/uL)	5.4	(4.0-5.7)
Hgb (g/dL)	16	(12.5-16.5)
HCT (%)	50	(42-51)
MCV (fL)	88	(80-100)
MCH (pg)	32	(27-35)
Platelets (thousands/uL)	330	(130-440)

Case Study, *cont.*

Mr. DB's Chest Film

- How about that area of opacification region of the right middle lobe?
- Is that an exudate, transudate or solid mass?

Case Study, *cont.*

A purulent (acute) exudate in the alveolar spaces with areas of abscess formation

Case Study, *cont.*

Mr. DB's sputum culture results

- Mucoid colonies of
  - Gram negative rods
  - Many with thick capsules
- *Klebsiella pneumoniae*

Case Study, *cont.*

- Mr. DB was started on Ceftriaxone IV and placed on oxygen therapy.
- As a nurse, what are the interventions you will perform to manage his condition?

(*Focus on presenting signs & symptoms, comorbidity, & treatment regimen*)

- Independent interventions –
- Dependent interventions –

Nutrition

Latest studies: A third of Americans are overweight, and an additional quarter are obese.

*What are the importance of assessing height and weight?

What are the factors that affect height and weight?

Measurements to assess Height, Weight, & Body Fat

- **Body Mass Index (BMI)**
  - Used to indicate body fat stores and whether a person's weight is appropriate for the height.
  - Considered a general screening tool
  - Useful estimate to assess for malnutrition or obesity; however, it can give misleading results.
  - BMI calculation, see Berman, p. 1131.

BMI, cont.

	BMI (kg/m^2)
Underweight	<18.5
Normal	18.5 – 24.9
Overweight	25 – 29.9
Obesity	30 and above

Limitations of BMI

- Age
- Ethnic considerations
- Amount of muscle present
- Excess fluid retention

Measurements to assess Height, Weight, & Body Fat

- Waist size

Guidelines:

- Women: 35 inches or below
- Men: 40 inches or below
- Ethnic considerations

(www.cdc.gov/healthyweight/assessing)

Measurements, cont.

Size of abdomen

- Central obesity is risk for CAD

Waist-to-hip ratio

- Reflects risk for MI
- 0.8 (80%) or less for women
  - 32”/40” = 0.8
- 0.9 (90%) or less for men
  - 38”/42” = 0.9
- Apple-shaped vs. Pear-shaped bodies

Anthropometric Measurements

-To quantify body composition

Triceps skinfold (TSF)

Mid arm circumference (MAC)

Mid-arm muscle area (MAMA)

see formula in Berman, p. 1146

Nutritional Considerations

- Macronutrients
  - Carbohydrates – sugar, starches, fibers
  - Proteins
    - essential amino acids vs. non-essential amino acids
    - complete vs. incomplete proteins
  - Fats – saturated vs. unsaturated

Nutritional Considerations, cont.

- Micronutrients
  - water soluble vitamins vs. fat soluble vitamins
  - macrominerals vs. microminerals

Case Study

Fattest Woman In The World Loses 800lbs- Mayra Rosales

Factors affecting Nutrition

- Development
- Ethnicity & culture
- Personal preferences
- Lifestyle
- Medication & therapy
- Alcohol consumption
- Psychological factors

Factors affecting Nutrition, cont.

- Gender
- Beliefs about food
  - Food fads & myths
- Religious practices
- Economics
- Health
- Advertisement

Altered Nutrition
BMI

Malnutrition

Overnutrition

Undernutrition

Malutrition, overnutrition and undernutrition
vs.
Overweight, obese and morbid obese

Assessment

- Nutritional screening
- Nursing history
- Physical findings
  - Degree of weight loss, certain physical and lab indicators

"Today I ate two bowls of dog food, a sandwich crust, some spaghetti that fell on the floor, half of your cat food, a wet tea bag, three bugs and the inside of a sneaker. How many grams of fat is that?"

Standards for Healthy Diet

Food Plate

- MyPlate is the current nutrition guide published by the United States Department of Agriculture, a food circle (i.e. a pie chart) depicting a place setting with a plate and glass divided into five food groups.

- A place setting for a meal to create awareness to think what goes on your plate before eating.

(http://www.choosemyplate.gov)

2015- 2020 Dietary Guidelines for Americans

(http://health.usnews.com)

- "Plant foods prevail; sugar suffers and eggs catch a break."
- "Eggs are making a comeback while meat is being shunned."
- Neutral stance
  - lean meat and poultry are no longer favored foods
  - Americans are getting twice as much protein as needed.

2015-2020 Dietary Guidelines , *cont.*

What's "**Out**" for 2015 (and recommendations)

- Sugar - huge culprit
  - recommendation is water.
- Refined grains
  - whole multigrains
- Red & processed meats
  - "grass-fed cow", steak once a week
- Saturated fats
  - Less than 10% of total daily calories
- Salt
  - 2,300 mg/day

(www.health.gov/dietaryguidelines)

Healthy People 2020

New Objectives:

- Prevent inappropriate weight gain in youth and adults.
- Reduce consumption of calories from solid fats and added sugars in the population aged 2 & older.

(www.healthypeople.gov/hp2020)

Healthy People 2020, *cont.*

- Increase the number of States that have State-level policies that incentivize food retail outlets to provide foods that are encouraged by the Dietary Guidelines.
- Increase the number of States with nutrition standards for foods and beverages provided to preschool-aged children in childcare.

(www.healthypeople.gov/hp2020)

Healthy People, *cont.*

- Increase the percentage of schools that offer nutritious foods and beverages outside of school meals.

(www.healthypeople.gov/hp2020)

What is the bottom line?

- Healthy diet is based on quality and quantity. It is also built on a base of regular exercise, which keeps calories in balance and weight in check.

Group 1: Fever

- What are the nursing interventions on a client experiencing the three stages of fever? *(See handout)*
- Give examples of health teachings in the interventions.
- Clarify misconceptions identified from Hispanic, Asian, Middle Eastern, and European cultures.

Group 2: Vital Signs

- What are the advantages and disadvantages of taking VS in a scheduled time?
- Present a plan and/or modification and rationale on how to take VS on the following situations:
  - At 1245, client came back from smoking, demanding his morphine ASAP. Medication is not due. He refused VS to be taken as scheduled.
  - Client has right breast mastectomy; her left arm has an ongoing blood transfusion.

Group 3: Dietary Guidelines

- How do dietary guidelines affect the people's behavior in attaining ideal or acceptable body weight?
- From your opinion, are the DHS health initiatives effective on alleviating obesity? (yes or no, and explain why)
- Can you propose an additional and/or alternative plan to lower obesity rate?

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Group 4: Vital Signs

- A. B., 46 y/o female, 2nd day post cholecystectomy, is on the following medications: Vicodin PRN for pain, Ancef (antibiotics) IV, Colace (stool softener). VS as follow: **37.4 °C, 140/95, 99 irregular HR, 24 RR, 4/10 abd pain**.
- Considering the abnormal VS, what are the nursing considerations and priority interventions?

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Group 5: Nutrition

- What are the factors affecting nutrition? Give examples. *(See handout)*
- What are the possible complications of malnutrition in the hospital setting?
- What are the implications in legal and healthcare system perspectives?

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Group 6: Nutrition

- A 42-year old female with admitting diagnoses of failure to thrive and bulimia requires assistance during mealtimes. Poor appetite, refusal to eat, daily weight of 70 lbs (31.8 kgs), and height of 5’3” have been documented.

- As a nurse, how will you facilitate nutritional intake?