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Short Textbooks for Nursing Education - Focus on Geriatric Care

Theo Ahrens

Monitoring Vital Signs

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Bibliographic information

Theo Ahrens – Short Biography

Theo Ahrens, born in 1979 near Munich, is a teacher of nursing professions and a dedicated nursing educator. After a voluntary social year in a hospital, he completed training to become a registered nurse and gained valuable work experience in the intensive care unit. Driven by his desire to impart knowledge, he studied nursing education and began teaching at a vocational school in Munich in 2009. Theo is known for his practical and empathetic teaching, with which he prepares future nurses for their demanding profession. Privately, he lives with his wife and two children in Berlin and volunteers for better conditions in nursing education.

This short textbook was formulated from the lesson plans of his teaching using AI. The translation was done automatically.

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1 General Information on Monitoring Vital Signs

Monitoring Vital Signs in Elderly Care

The monitoring of vital signs is crucial in elderly care. Vital signs provide essential information about the health status and vital functions of older adults. Regular monitoring allows for the early detection of health changes and potential risks.

The objectives of vital sign monitoring include identifying anomalies, supporting diagnosis, assessing the effectiveness of treatments, and ensuring resident safety. An objective understanding of the health status enables better individual care planning and adaptation.

The tasks involved in monitoring include systematically recording, interpreting, and documenting values such as blood pressure, pulse rate, respiratory rate, and body temperature. These tasks require precision and diligence, as even minor changes can indicate serious health issues.

Caregivers bear a high professional responsibility. They are obligated to continuously observe vital signs and act promptly in the event of deviations. This includes immediate reporting to superiors or doctors and, if necessary, initiating appropriate measures. This responsibility also encompasses possessing technical knowledge for using monitoring devices and staying updated on the latest nursing guidelines.

Caregivers must act ethically and professionally to ensure the highest standard of resident care. They should regularly participate in further education to expand their expertise and be prepared for current developments in vital sign monitoring. The sustainable assurance of high care quality remains a central aspect of professional responsibility.

2 Basic Knowledge of Vital Signs

2.1 Definition and Importance of Vital Signs

Vital signs are measurable physiological parameters that provide insight into a person's health status. They serve as fundamental indicators of vital bodily functions.

The most important vital signs include pulse, blood pressure, respiration, body temperature, and oxygen saturation. This list is often supplemented by the level of consciousness, which also provides essential information for assessing health status.

Monitoring these signs enables the early detection of changes in health status. Regular monitoring helps identify acute deteriorations or chronic developments, allowing for timely and appropriate therapeutic measures.

In the context of elder care, vital signs hold particular significance. Older individuals are more susceptible to health fluctuations, and the correct interpretation of vital signs can be crucial for their well-being and stability. Accurate monitoring aids caregivers in reducing health risks and improving the quality of life for those in their care.

For caregivers to reliably assess and respond to the health status of those they care for, a solid understanding of vital signs and their interactions is necessary. Interpretation requires both theoretical knowledge and practical experience.

Overall, vital signs are an indispensable tool in elder care that significantly influences the health and care process. Their importance lies not only in representing physical constitution but also in their role within a holistic care framework. Preventive, diagnostic, and therapeutic decisions are often based on the information obtained through the monitoring of vital signs.

2.2 Which vital signs are monitored?

Monitored vital signs include pulse, blood pressure, respiration, body temperature, oxygen saturation, and level of consciousness.

The pulse represents heart rate and rhythm. It provides insight into heart health and circulatory status. Typically, the pulse is measured at the radial, brachial, or carotid arteries.

Blood pressure consists of systolic and diastolic values. These values indicate the pressure conditions in the arteries during heart contraction and relaxation phases. Deviations can indicate circulatory issues or organ stress.

Respiration includes respiratory rate and quality of breathing. Changes in rate or quality often serve as early indications of respiratory problems or metabolic changes.

Body temperature is an indicator of thermoregulatory status and can suggest infections or other pathological conditions. Measurements are usually taken orally, axillarily, or rectally.

Oxygen saturation indicates the percentage of hemoglobin saturated with oxygen. Low levels may suggest airway obstructions, heart issues, or inadequate ventilation.

Level of consciousness reflects cognitive and neurological function. Changes in orientation, alertness, or responsiveness require immediate assessment and may indicate neurological or systemic emergencies.

Regular monitoring of these vital signs provides essential information for the care of older adults and aids in decision-making for necessary nursing or medical interventions.

2.3 Normal Values of Vital Signs and Their Age Dependence

Pulse Rate, Blood Pressure, Respiratory Rate, Body Temperature, Oxygen Saturation, and Level of Consciousness have different normal values depending on the age group, which are crucial for the care of elderly individuals.

Pulse Rate: Generally, the normal heart rate for healthy adults ranges between 60 and 100 beats per minute. However, in older adults, the resting heart rate can often be lower due to reduced physical activity, medications, or physiological changes in the cardiovascular system. Nonetheless, it should not consistently fall below 60 beats per minute at rest.

Blood Pressure: Normal blood pressure for adults is considered to be around 120/80 mmHg. In older adults, normal values often slightly increase due to vascular changes. A systolic blood pressure between 120 and 139 mmHg and a diastolic pressure between 80 and 89 mmHg are often still acceptable, depending on the individual's health status.

Respiratory Rate: The normal respiratory rate for adults is between 12 and 20 breaths per minute. In older age, the respiratory rate can vary but often remains within the mentioned range. A significant deviation may indicate respiratory or metabolic issues.

Body Temperature: In healthy adults, the normal body temperature is approximately 36.1 to 37.2 degrees Celsius. In older age, the average body temperature can be slightly lower. It is important to note even minor deviations, as they may indicate pathological conditions.

Oxygen Saturation (SpO₂): Normal values range from 95-100% in healthy adults. In older adults, it can be lower due to lung diseases or heart problems. Values below 92% require special attention and often medical clarification.

Level of Consciousness: Changes are recognized less by exact values and more by observed deviations in behavior or responsiveness. In older adults, a slow adjustment or altered alertness is often normal, but sudden or significant changes require immediate assessment.

In elderly care, understanding these normal values in the context of the individual's health condition is important to identify deviations and respond appropriately.

2.4 Deviations of Vital Signs and Their Significance

In the event of deviations in vital signs, it is important to correctly identify potential health risks.

Pulse deviations: Tachycardia, defined as an elevated heart rate over 100 beats per minute, can indicate fever, stress, heart failure, or anemia.

Bradycardia, a heart rate below 60 beats per minute, could be caused by medications, heart diseases, or metabolic issues.

Blood pressure fluctuations: Hypertension (high blood pressure) increases the risk for cardiovascular diseases and can result from stress, diet, or genetic factors. Hypotension can lead to dizziness and fainting and is often associated with volume depletion or heart problems.

Respiratory anomalies: Tachypnea, an increased breathing rate, suggests respiratory diseases, pain, or stress. Bradypnea, a decreased breathing rate, can be caused by medication effects or neurological disorders. Shallow or irregular breathing also requires immediate attention.

Temperature changes: Fever often signals an infection or inflammation, and increases above 38°C are significant. Hypothermia, below 35°C, may indicate environmental factors or metabolic disorders and requires swift intervention to avoid life-threatening conditions.

Oxygen saturation fluctuations: An SpO₂ below 92% indicates insufficient gas exchange, often caused by respiratory diseases or heart defects. Urgent measures are necessary to prevent hypoxia.

Consciousness changes: Sudden disorientation or decreased alertness may indicate neurological problems or systemic diseases and require immediate evaluation.

Early detection and management of such deviations are crucial to ensure the health and well-being of older adults.

3 Pulse (Heart Rate) and Heart Rhythm

3.1 Definition and Measurement Methods of Pulse

The pulse is the palpable pressure wave that occurs when the heart pumps blood into the arteries. This wave can be felt at various points on the body. The pulse indicates both the heart rate—the number of heartbeats per minute—and the heart rhythm.

Manual method: The pulse can be manually palpated by gently pressing the fingertips on an artery. Commonly used pulse points are the radial artery (at the wrist), the carotid artery (side of the neck), or the brachial artery (inside of the upper arm). In this method, the heart rate is counted, usually over 15 seconds, and then calculated for one minute.

Electronic method: Electronic devices such as pulse oximeters or electronic blood pressure monitors can automatically measure the pulse. Sensors are used to detect changes in blood volume caused by pulsing. This method offers precise and continuous measurements and is particularly suitable for monitoring over longer periods.

The choice of measurement method depends on the situation and the required accuracy. The manual method requires training and practice to achieve reliable results, whereas electronic devices are easy to use but require regular functionality checks.

3.2 Normal Pulse Values and Deviations

Pulse norms vary depending on age and physical condition. In adults, the normal resting pulse is between 60 and 100 beats per minute. Higher pulse rates are normal in infants and young children, while trained athletes often exhibit lower values.

Deviations from the norm include bradycardia and tachycardia. Bradycardia refers to a pulse below 60 beats per minute. This can be caused by good physical fitness, but also by heart diseases, hypothyroidism, or the intake of certain medications. Tachycardia refers to a pulse above 100 beats per minute at rest. Causes can include physical exertion, stress, fever, dehydration, or conditions such as heart failure.

Recognizing deviations in pulse is crucial. Any significant change should be carefully documented and assessed in consultation with the medical team to determine the necessity of further investigations or therapeutic measures.

3.3 Observing Heart Rhythm

Heart Rhythm

The heart rhythm describes the regularity of heartbeats. A regular heart rhythm indicates a consistent sequence of heartbeats, whereas an irregular heart rhythm suggests deviations in this sequence. These irregularities are referred to as arrhythmias and can appear in various forms.

A careful observation of the heart rhythm is conducted using manual or electronic methods. Manually, the heart rhythm can be checked by palpating large arteries, paying attention to the timing of the heartbeats. Irregularities, such as extra or missing beats, are distinctly palpable in this manner.

Electronic aids like ECG devices offer a more comprehensive analysis of the heart rhythm. An ECG (electrocardiogram) records the heart's electrical activity and allows for accurate identification and classification of arrhythmias. This method provides detailed information about the duration and sequence of individual heartbeats and is indispensable when suspecting severe rhythm disorders.

There are several types of arrhythmias:

- **Bradyarrhythmias:** Slowed heart rhythm, often associated with bradycardia.
- **Tachyarrhythmias:** Accelerated heart rhythm, frequently associated with tachycardia.
- **Extrasystoles:** Additional beats occurring outside the regular heart rhythm.
- **Atrial fibrillation:** Irregularly rapid pulse rates that can represent a consistent rhythm disorder.

Recognizing and distinguishing heart rhythm disorders is essential. Any detected irregularity should be documented and communicated to the interdisciplinary team to ensure adequate clinical evaluation and therapy. Particular attention is required for sudden or symptomatic arrhythmias to prevent severe cardiac events. Continuous monitoring and seamless communication with the medical team support timely and effective intervention.

3.4 Factors Influencing Pulse

Pulse and heart rate are influenced by various factors that are frequently observed in nursing practice. One of the most important factors is physical activity. During physical exertion, the heart rate increases to meet the heightened oxygen demand of the muscles. This is a normal physiological reaction that gradually returns to resting levels after the activity ends. Regular exercise can also lead to a lower resting heart rate, as the heart works more efficiently and pumps more blood per beat.

Age also significantly influences pulse. Throughout life, age-related changes occur in the cardiovascular system. In newborns and young children, higher pulse rates are physiologically normal, whereas in older age, the resting pulse is often lower, even though the maximum heart rate that can be reached during exertion tends to decrease.

Medications are another significant factor that can influence pulse. Certain medications such as beta-blockers or cardiac glycosides lower the heart rate. Other medications, like thyroid hormones or sympathomimetics, can cause an increase in pulse. It is therefore essential to consider the patient's medication plan when interpreting pulse values.

Moreover, other factors such as stress, emotional excitement, fever, blood loss, and dehydration can lead to an increased heart rate. Stress and emotional excitement release adrenaline and other stress hormones that cause the heart to beat faster. Fever and infections can accelerate the pulse as the heart attempts to support the heightened metabolism due to increased body temperature. Blood loss and dehydration lead to tachycardia, as the heart needs to beat faster to compensate for the reduced blood volume in circulation.

A comprehensive understanding of influencing factors helps caregivers accurately interpret changes in pulse and take appropriate measures. Continuous training and observation are crucial to ensuring precise assessment and intervention.

3.5 Documentation and Interpretation of Pulse Values

A precise documentation of pulse values forms the basis for effective monitoring and assessment of cardiovascular changes. Documentation is typically done at specified intervals and is recorded in electronic or written care records. The time of measurement, the measured value, and possible influencing factors should be noted. Influencing factors may include physical activity or medication.

The recorded pulse values should always be interpreted in relation to normal values and the individual patient-specific characteristics. Comparing with previous measurements helps to identify trends and recognize changes. In case of deviations or abnormal values, the cause must be investigated. A distinction is made between physiological and pathological causes. Physiologically, factors like physical exertion can lead to increased pulse rate. Pathological causes may include conditions like arrhythmias.

It is advisable to discuss interpretations of the collected data with medical colleagues. Cooperation within the interdisciplinary team is crucial to initiate appropriate actions. Documentation standards may vary depending on the institution but should be as standardized and easy to follow as possible.

7 This is just a preview

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