University of Al-Mustaqbal
College of Science
Department of Medical Physics

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Data collection to assessment body health

A) The Physical Examination

During a health assessment, diagnosing an illness, disorder or a condition is like a puzzle. Diagnosis often includes laboratory studies, radiology studies to look at certain organs, and the physical exam itself. This process is called data collection. Before modern technology, it was important for doctor to perfect their physical examination techniques, because x-ray machines, scanners, and echocardiograms were non-existent.

Findings that are present on the physical exam may by themselves diagnose, or be helpful to diagnose, many diseases. The components of a physical exam include:

i) Inspection

Your examiner will look at, or "inspect" specific areas of your body for normal color, shape and consistency. Certain findings on "inspection" may alert your examiner to focus other parts of the physical exam on certain areas of your body. For example, your legs may be swollen.

ii) Palpation

This is when the examiner uses their hands to feel for abnormalities during a health assessment. Things that are commonly palpated during an exam include your lymph nodes, chest wall (to see if your heart is beating harder than normal), and your abdomen. He or she will use palpation to see if there are any masses or lumps, anywhere in your body.

iii) Percussion

This is when the examiner uses their hands to "tap" on an area of your body. The "tapping" produces different sounds. Depending on the kind of sounds that are

produced over your abdomen, on your back or chest wall, your examiner may determine anything from fluid in your lungs, or a mass in your stomach. This will provide further clues to a possible diagnosis.

iv) Auscultation

This is an important physical examination technique used by your doctor, where he or she will listen to your heart, lungs, neck or abdomen, to identify if any problems are present. Auscultation is often performed by using a stethoscope. The stethoscope will amplify sounds heard in the area that is being listened to. If there is an abnormal finding on your examination, further testing may be suggested.

Inspecting the abdomen

Auscultating the abdomen

Palpating the abdomen

Percussing the abdomen

B) The Neurologic Examination:

A neurologic examination may be performed. This can be very brief or more detailed depending on findings. In general the physical examination is divided

into 4 parts; cranial nerve assessment, motor function assessment, sensory function assessment, and assessment of reflexes.

C) Analysis of Body Fluids

- Blood
- Urine
- Fluid that surrounds the spinal cord and brain (cerebrospinal fluid(CSF))
- Fluid within a joint (synovial fluid)

Less often, sweat, saliva, and fluid from the digestive tract (such as gastric juices) are analyzed. Sometimes the fluids analyzed are present only if a disorder is present, as when fluid collects in the abdomen, causing ascites, or in the space between the two-layered membrane covering the lungs and lining the chest wall (pleura), causing pleural effusion.

D) Measurement of Body Functions

Often, body functions are measured by recording and analyzing the activity of various organs. For example, electrical activity of the heart is measured with electrocardiography (ECG), and electrical activity of the brain is measured with electroencephalography (EEG). The lungs' ability to hold air, to move air in and out, and to exchange oxygen and carbon dioxide is measured with pulmonary function tests.

E) Biopsy

Tissue samples are removed and examined, usually with a microscope. The examination often focuses on finding abnormal cells that may provide evidence of

inflammation or of a disorder, such as cancer. Tissues that are commonly examined include skin, breast, lung, liver, kidney, and bone.

F) Analysis of Genetic Material (Genetic Testing)

Usually, cells from skin, blood, or bone marrow are analyzed. Cells are examined to check for abnormalities of chromosomes, genes (including DNA), or both.

***When a physician must decide if the patient is ill or not, and what the illness is?**

After a physician has reviewed a patient's: -

1. Medical history.
2. The findings of the physical examination.
3. The results of the clinical laboratory measurements.

Measurements of physiological, biochemical, physical, and other patient-related variables produce results; these results from such measurements also provide essential information for critical decision-making in clinical practice, as well as for research and technology development.

Erroneous measurements can jeopardize patient safety and can expose the most critically ill patients to severe hazards.

The decisions are two types: -

1. Right decisions.
2. Wrong decisions.

It is not surprising that sometimes **wrong decisions** are made. These wrong decisions are of **two** types: -

1. False Positives.

2. False Negatives.

A **false positive** error occurs when a patient is diagnosed to have a particular disease when he or she does not have it.

A **false negative** error occurs when a patient is diagnosed to be free of a particular disease when he or she does have it.

Note: -

In some situations a diagnostic error can have a great impact on a patient's life.

For Example: -

A young woman was thought to have a rheumatic heart condition and spent several years in complete bed rest before it was discovered that a **false positive diagnosis** had been made-she really had arthritis, a disease in which activity should be maintained to avoid joint stiffening.

In the early stages of many types of cancer it is easy to make a **false negative diagnostic** error because the tumor is small. Since the probability of cure depends on early detection of the cancer, a false negative diagnosis can greatly reduce the patient's chance of survival.

Diagnostic errors (false positives and false negatives) can be reduced by: -

1-Research into the causes of misleading laboratory test values.

2-Development of new clinical tests and better instrumentation.

3-Using care in taking the measurement.

4-Repeating measurements.

5-Using reliable instruments.

6-Properly calibrating the instruments