Aim: Determination of Heart Rate and Pulse Rate

References:

1. Guyton, A. C., & Hall, J. E. (2016). Textbook of Medical Physiology. Elsevier.

2. Tortora, G. J., & Derrickson, B. (2019). Principles of Anatomy and Physiology. Wiley.

3. American Heart Association (AHA) Guidelines on Heart Rate and Pulse Measurement.

Objective: To determine the heart rate and pulse rate in a given subject and understand the physiological significance of these parameters.

Principle: Heart rate (HR) refers to the number of times the heart beats per minute (bpm), while pulse rate (PR) is the number of palpable arterial pulsations per minute. These parameters help assess cardiovascular health and detect abnormalities such as tachycardia or bradycardia.

Requirements: Stopwatch or digital timer, Stethoscope, Sphygmomanometer (optional), Pulse oximeter (optional), Subject (volunteer), Notebook and pen for recording observations

Methodology:

1. Determination of Heart Rate (HR)

1. Ensure the subject is seated or lying down in a relaxed position.

2. Place the diaphragm of the stethoscope over the subject's chest at the left side (over the apex of the heart).

3. Count the number of heartbeats for one full minute using a stopwatch.

4. Alternatively, count for 15 seconds and multiply by 4 to get beats per minute (bpm).

5. Record the heart rate.

2. Determination of Pulse Rate (PR)

1. Ensure the subject is in a resting position.

2. Locate the radial artery (on the wrist, near the base of the thumb) using the index and middle fingers.

3. Apply light pressure and count the pulsations for one full minute.

4. Alternatively, count for 15 seconds and multiply by 4 to get beats per minute (bpm).

5. Record the pulse rate.

Normal Values:

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Population	Heart Rate (bpm)	Pulse Rate (bpm)
Adults	60-100	60-100
Children (6-15 years)	70-100	70-100
Infants	100-160	100-160

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Sample Result Table:

Subject ID	Heart Rate (bpm)	Pulse Rate (bpm)	Interpretation
101	72	74	Normal
102	88	90	Normal
103	110	112	Elevated
104	55	56	Low
105	98	96	Normal

Precautions:

- Ensure the subject is relaxed before measurement.
- Avoid using the thumb to measure the pulse as it has its own pulsation.
- Repeat measurements if results seem inconsistent.

- Avoid talking or moving during the measurement.
- Use a pulse oximeter for more accurate readings if available.

Clinical Significance:

Increased Heart/Pulse Rate (Tachycardia): Can indicate fever, dehydration, stress, anemia, hyperthyroidism, or cardiovascular diseases.

Decreased Heart/Pulse Rate (Bradycardia): Can be seen in athletes, hypothyroidism, heart block, or as a side effect of certain medications.