

Vital lab worksheet #02

Blood pressure

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Analysis:

Exercise 1: Auscultation of blood pressure

Subject's name	Systolic Pressure(mmHg)	Diastolic Pressure (mmHg)
Amin	80	60
Mahdi	100	70
Average of two trials	90	65

Exercise 3,4 and 5: Measuring systolic pressure

Amin

Measurement location	Systolic pressure (mmHg)
Upper arm	85
Forearm	85
Leg	120

Mahdi

Measurement location	Systolic pressure (mmHg)
Upper arm	100
Forearm	85
Leg	130

Results:

Exercise 2-5: Measurement of blood pressure

Fill in the table blow with your data from this experiment.

Amin

Measurement location/condition	Systolic pressure	Diastolic pressure
Resting measurement from upper arm	80	60
Upper arm(pulse measurement)	85	60
Forearm (pulse measurement)	85	60
Leg (sitting)	120	80
Leg (standing)	200	150

Mahdi

Measurement location/condition	Systolic pressure	Diastolic pressure
Resting measurement from upper arm	100	70
Upper arm(pulse measurement)	100	65
Forearm (pulse measurement)	85	60
Leg (sitting)	130	90
Leg (standing)	170	140

Conclusions:

1. What are some possible sources of error or variation in this technique of blood pressure measurement?

When measuring blood pressure using a cuff, there are several sources of error or variation that can affect the accuracy of the measurement:

1. Cuff Size: If the cuff is too small, it can artificially elevate the blood pressure reading. Conversely, if the cuff is too large, it can underestimate the blood pressure.
2. Cuff Placement: Incorrect placement of the cuff can also lead to inaccurate readings. The cuff should be positioned at heart level on the upper arm, with the bottom edge of the cuff about 2-3 cm above the elbow crease.
3. Inadequate Rest: Blood pressure measurements should be taken after the individual has been resting for at least 5 minutes in a seated position (for example if we take the blood pressure of one arm we can't immediately test the same arm again we either have to use the other arm or wait 5 minutes).
4. Arm Position: The individual's arm should be supported at heart level during the measurement.
5. Cuff Inflation/Deflation Rate: The rate at which the cuff is inflated and deflated can affect the accuracy of the measurement. Inflating the cuff too quickly or too slowly can result in inaccurate readings.
6. Observer Error: In some cases, errors may occur due to human factors, such as improper technique by the person performing the measurement or mistakes in hearing the auscultatory sounds.
7. Movement or Talking: Movement or talking during the measurement can affect the accuracy of the reading.

2. Explain the events occurring in the heart during:

- a. systole
- b. diastole

During systole, the heart contracts to pump blood out to the body. The atria contract first, pushing blood into the ventricles, followed by ventricular contraction, forcing blood out through the semilunar valves into the pulmonary artery and aorta.

During diastole, the heart relaxes and refills with blood. Initially, both the atria and ventricles are relaxed, allowing the ventricles to passively fill. Then, the atria contract to push the remaining blood into the ventricles, completing the cycle.

3. How does your estimate of systolic pressure in the upper arm compare with your results from part 1 of this lab?

In both cases they were very similar (± 5 mmHg), the difference may be due to the error that were explained in the first question.

4. Does systolic pressure differ between the forearm and upper arm?

The pressure measured in the upper arm (brachial artery) is generally higher than in the forearm because the arteries in the upper arm are closer to the heart and experience less resistance. As blood travels further away from the heart, such as to the forearm, there can be some decrease in pressure due to resistance in the smaller arteries and arterioles.

However, the difference in systolic blood pressure between the forearm and upper arm might not be significant for everyone and can vary depending on factors such as individual physiology, health conditions, and measurement techniques.

As shown in results section when doing the exercise for Amin the difference between systolic pressure of upper arm and forearm was not that significant but for Mahdi there was 15 (mmHg) difference between the two.

5. How does your estimate of systolic pressure in the leg compare with that from the upper arm?

They were pretty similar as well, although it is harder to get the blood pressure of the leg using a cuff so there may be more errors or variations.

6. What happened to blood pressure in the leg when you were standing up?

The blood pressure in leg while standing up will increase due to the effects of gravity.