

Independent Project: Baroreceptors

Background: Baroreceptors are special sensory receptors that play a crucial role in regulating blood pressure and watch over cardiovascular homeostasis. These receptors are mainly located in the walls of various blood vessels. With that being said, two of the main locations are the carotid sinuses in the carotid arteries and the aortic arch. Baroreceptors regularly monitor changes in blood pressure and transfer this information to the central nervous system to begin the appropriate physiological responses.

Question: "In investigating baroreceptor function, how do the responses of men and women vary during changes in body position, particularly the transition from lying to standing, and what understanding can be gained into potential gender-specific variations in cardiovascular regulation?"

Hypothesis: "Sex-Based Differences Exist in Baroreceptor Sensitivity, Leading to Differences in Cardiovascular Regulation between Males and Females." This hypothesis suggests that there are natural sex-based differences in the sensitivity of baroreceptors, and as a result, males and females may present distinct patterns of cardiovascular regulation. My prediction is that men will always have much higher blood pressure, either in a standing or laying position. Therefore, I also expect for men to have a faster BPM.

Experiment:

Purpose:

The purpose of this experiment is to test how the responses of men and women differ during changes in body position, particularly the transition from lying to standing, and what insights can be gained into potential gender-specific variations in cardiovascular regulation.

Materials:

1. You can use a sphygmomanometer or an electronic digital upper arm heart monitor
*NOTE: if you are using a sphygmomanometer follow these steps when checking the blood pressure.
 1. Wrap the pressure cuff of the sphygmomanometer snugly around the upper left arm
 2. Place the stethoscope securely over the brachial artery. Close the pressure valve and begin pumping up the rubber ball.
 3. Close the valve on the pump. Squeeze the pump until the number is about 160 (or more).
 4. Open the valve slowly. Listen for thumping sounds in the stethoscope.
 5. Note the number when you first hear sounds (that's the "systolic" number). Note when the sounds stop (that's the "diastolic" number).
 6. Write down the numbers like this: 120/80.

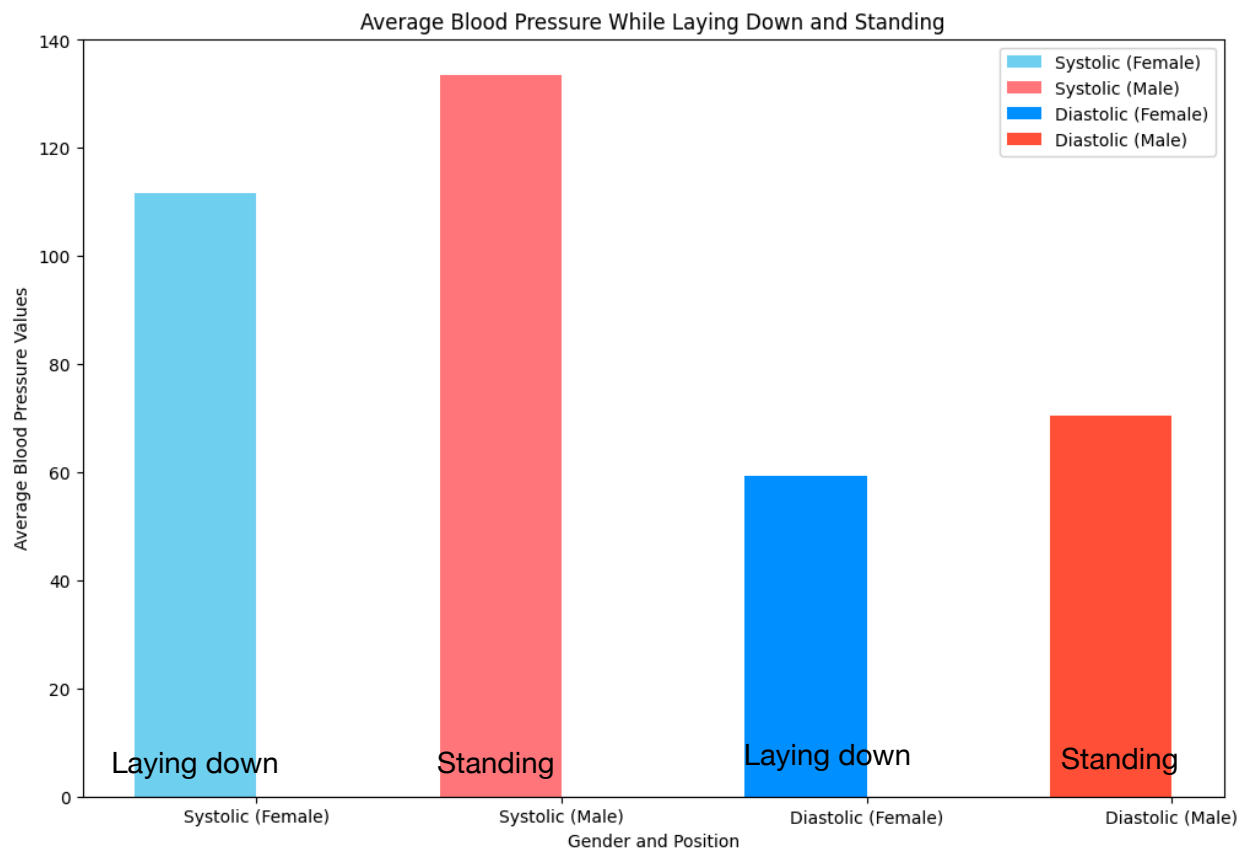
Procedure:

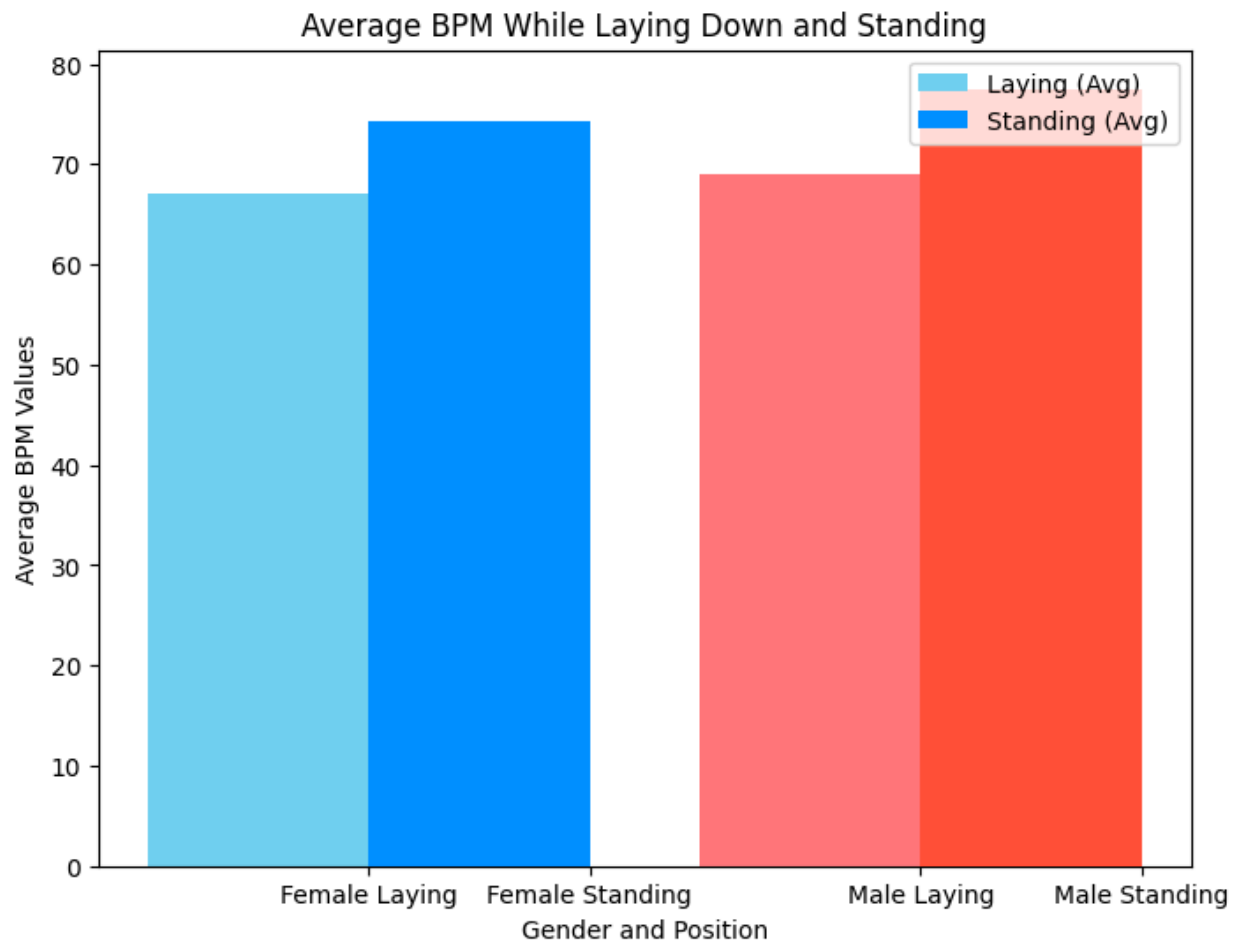
Determination of blood pressure:

1. Have either a man or a woman lay down in a flat surface for 30 seconds.
2. Wrap the pressure cuff of the electronic digital upper arm heart monitor snugly around the upper left arm of your lab partner, press the start.
3. Write down the Systolic, Diastolic (*Write down the numbers like this: 120/80*), and Pulse results of the laying position
4. Now have that person stand up.
5. Without removing the cuff of the electronic digital upper arm heart monitor immediately, press start
6. Write down the Systolic, Diastolic (*Write down the numbers like this: 120/80*), and Pulse results of the standing position.

Results:

	Blood pressure: Laying down Systolic	Blood pressure: Laying down Diastolic	BPM: Laying down	Blood Pressure: Standing Systolic	Blood Pressure: Standing Diastolic	BPM: Standing
Flor	124	59	69	156	87	69
Adry	107	55	60	118	70	59
Diana	104	64	72	112	71	95
Leo	147	82	74	146	96	79
Noah	120	59	64	128	69	76





Discussion:

As we can see in the results the average diastolic blood pressure while laying down for the three women was 111.66 (rounded to 112). While, the average diastolic blood pressure while laying down for the two men was 133. The average systolic blood pressure while laying down for the women was 59, meanwhile for the men it was 70. The average BPM while laying for the women was 67, and for the men it was 69.

The average diastolic blood pressure for women while standing up was 128.66 (rounded to 129), while for the men it was 137. The average systolic blood while standing up for the women was 76, and for the men it was 82. The average BPM while standing up for the 3 women was 74, compared to the men who had an average of 77.

Conclusion:

In conclusion, my hypothesis of men having higher blood pressure, and faster BMP while in a standing and laying position was correct. According to the website ahajournals.org studies have shown that androgens may contribute to an increase in blood pressure in males, by stimulating renin activity and Ang II formation. With that being said, men typically have higher blood pressure, and tend to develop cardiovascular disease earlier than women. According to my.clevelandclinic.org women tend to have higher heart rates than men. This may be due to the fact, that women have a slightly smaller heart, so the heart must beat faster to pump the same amount of blood that a man's heart pumps. I am not sure why in my independent project the average BPM for the men was higher. Although, I did notice that my standing BPM was higher than both men.