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| Principles of biomedical science |
| Blood Pressure Measurement vs. Level of Activity |
| At rest vs. running |
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(Abstract)

The purpose of this report is to study the effect of physical activity, whether at rest or running, on blood pressure. The procedure taken began by taking blood pressure readings from a subject for three trials, letting a few minutes pass in between readings, this serving as the rest blood pressure measurement; the subject began running in place for five minutes for another three trials, letting enough time in between trials for the subject to steady down before running again. The results of the experiment for the rest blood pressure measurements showed for Trial 1: 120/80, Trial 2: 122/82, Trial 3: 118/78, and for the running measurements for Trial 1: 155/88, Trial 2: 162/90, Trial 3: 152/88. Therefore, this experiment concluded stating that the higher the level of activity taken by a subject, the higher the blood pressure measurement the subject will have.

(Background)

Blood pressure is the measure of the force of blood pushing against blood vessel walls. The heart pumps blood into the arteries (blood vessels), which carry the blood throughout the body. High blood pressure, also called hypertension, is dangerous because it makes the heart work harder to pump blood to the body and contributes to hardening of the arteries, or atherosclerosis, and to the development of heart failure.

In class, time was spent measuring blood pressure with a sphygmomanometer to get familiar with the equipment customarily used. After this activity, classmates took each others’ blood pressure using the Logger Pro® software and the automated blood pressure cuffs, and the blood pressure values were collected and saved on the software. These recordings were taken without the effect of an external variable.

The purpose of this experiment is to observe how blood pressure is effected by an external variable. The external factor chosen was physical activity in which a person runs in place for five minutes. These results will be compared to the measurement of the same person’s blood pressure while he is at rest.

(Hypothesis)

The blood pressure of a subject will be higher when the subject is running, a higher level of activity, than when he is at rest, a lower level of activity.

(Materials and Methods)

-Computer with Vernier Logger *Pro*® software

-Vernier LabQuest Mini® with USB cable

-Vernier Blood Pressure Sensor

-Timer

The Logger Pro® software was started and the *Blood Pressure* program was opened. The LabQuest Mini was connected to the computer using the USB cable, and the Blood Pressure Sensor was connected the LabQuest Mini. Blood pressure readings were taken from the subject and recorded for three trials, letting a few minutes pass in between readings (this is the rest blood pressure measurement and the control variable). The subject began running in place for five minutes. As soon as the timer reached the indicated time, a group member was already ready with the handcuff to be put on the runner and another member ready to click the collect button on the software. The runner was allowed enough time for his blood pressure to return to normal before running again and repeating the process for another two trials.

(Results)

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| **Blood Pressure Measurement** | | | |
| **Level of Activity:** | **Trial 1:** | **Trial 2:** | **Trial 3:** |
| At Rest | 120/80 mmHg | 122/82 mmHg | 118/78 mmHg |
| Running | 155/88 mmHg | 162/90 mmHg | 152/88 mmHg |

This table holds the blood pressure measurements for three trials at two different levels of activity: while the subject was at rest and when he was running. The results for the first trial showed the at rest measurement to be 120/80 mmHg, and the running to be 155/88 mmHg. For the second trial, the results showed 122/82 mmHg to be the rest measurement and 162/90 mmHg to be the running measurement. Finally, the results for the third trial showed the at rest blood pressure of the subject was 118/78 mmHg and the running measurement was 152/88 mmHg.

(Discussion)

The results for the first trial showed the diastolic pressure increased 35 mmHg and the systolic pressure increased 8 mmHg in the blood pressure measurement for running which was 155/88 mmHg, compared to the measurement at rest which was 120/80 mmHg. The results for the second trial showed the diastolic pressure increased 40 mmHg and the systolic pressure increased 8 mmHg in the blood pressure measurement for running which was 162/90 mmHg, compared to the measurement at rest which was 122/82 mmHg. Finally, the results for the third trial showed the diastolic pressure increased 34 mmHg and the systolic pressure increased 10 mmHg in the blood pressure measurement for running which was 152/88 mmHg, compared to the measurement at rest which was 118/78 mmHg. Therefore, the results are demonstrating that, overall, the blood pressure was affected by the external factor and increased. Reflecting on the blood pressure information researched and provided in the Background section, the subject’s heart must have been working harder to pump blood to the body because of the high blood pressure measurements; although it would seem that this person had hypertension, after further evaluation, it would be seen that there is nothing wrong with the person because he was effected by the external factor of running. There may have been errors in the measurements of the person’s blood pressure after running for the five minutes because maybe too much time was taken in between him having stop from running to trying to put the cuff on. A more accurate measurement could probably taken if the cuff is left on the runner and the Collect button is pressed about three seconds before the five minutes are up to allow for the cuff to inflate. Having repeated the test three times should provide the experiment with a precise average for the results.

(Conclusion)

The subject’s blood pressure was continuously higher, about an average of 36 mmHg higher for diastolic pressure and 9 mmHg higher for systolic pressure, when he was at a higher level of activity compared to when he was at rest.

(Citations)

Understanding blood pressure readings. (2012). American Heart Association. Retrieved from http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/AboutHighBloodPressure/Understanding-Blood-Pressure-Readings\_UCM\_301764\_Article.jsp