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Introduction

This experiment is to evaluate the effects of the use of drugs on the human body, particularly, the effects of Salbutamol on asthmatic patients.

Specifically, this paper seeks to describe what a drug is and the principles behind the actions of drugs and to detail drug receptor interactions such as specificity, binding, affinity, antagonists, and agonists. In this study, participants performed the Harvard modified step test. The aim of this study of this test is to measure the maximal physical working capacity such as the maximal oxygen intake (Rhyming, 1953). It is hypothesized that maximal working capacity such as maximal oxygen will be quite high for people with sedentary lifestyle or asthma and slightly above normal in non-asthmatic participants

Asthma is a form of acute lung injury characterized by impaired oxygenation as well as bilateral infiltrates on a chest radiograph in the absence of evidence of left atrial hypertension (Manocha and Gordon et al., 2006).

During asthma attack, a β_2 adrenergic agonist is prescribed by doctors to ease the discomfort in breathing. A β_2 adrenergic agonist causes the smooth muscles to relax through the increase of the intracellular cyclic adenosine monophosphate. When Salbutamol is taken, the uterine and bronchial muscles relax, heart rate increases, peripheral vessels dilate, and there are other metabolic effects. A prescription drug pertains to any drug that requires a written permit by the doctors or health specialists prior to the release of the drug to the customers (Goldman, Joyce and Zheng, 2007).

An example of a β_2 adrenergic agonist is Salbutamol. Salbutamol is

administered through inhalation. The outcome of this is direct stimulation of the B2 adrenoreceptors in the bronchi hence bronchodilation happens. This is believed to be caused by stimulation of adenyl cyclase leading to increased levels of cyclic AMP in the cells. When this happens, entry of calcium into the cells is inhibited thereby inhibiting the contraction of smooth muscle. Further, increased levels of cyclic AMP in mast cells may likewise prevent the release of reacting substance-A (SRS-A) and histamine. Following the administration of Salbutamol, beta 2 and beta 1 adrenoreceptors happen since beta2 selectivity is not complete. This leads in the beta 1 impact such as stimulation of the cardiac muscle while beta 2 impacts are on hypotension and peripheral vasodilatation.

Salbutamol is a beta2-adrenoreceptor drug used as a stimulant. Salbutamol contains a relaxant impact of the smooth muscle of the airways that are usually in spasm during asthma attacks. Salbutamol offers initial relief to acute asthma attack, expiratory wheezing relative to anaphylaxis, allergy, and smoke inhalation, and other lower airway obstruction; worsening of Chronic Obstructive Pulmonary Disease; and shortness of breath in individuals with breathing difficulty because of failure in the functioning of the left ventricle.

Methods

In conducting the Harvard modified step test, six participants performed the experiment. Three of the participants are asthmatic while the other three are non-asthmatic. The procedures for non-asthmatic participants include the following: First, the three non-asthmatic participants were asked to sit comfortably. After 5 minutes, heart rate and breath rate of the three non-

asthmatic participants were measured. After gathering the values, a modified Harvard step test was performed. In this test, the participants were asked to step up and down for five minutes. After 5 minutes, participants took their seats to relax for 5 minutes. After 5 minutes, heart rate and breath rate measurements followed. The participants were allowed to sit for another 5 minutes before repeating all measurements for the last time.

For the three asthmatic participants, they were initially asked to sit comfortably. After 5 minutes, heart rate and breath rate were measured. The participants were then asked to take 1 puff of the inhaler. After 5 minutes of rest, heart rate and breath rate were again measured. After the values were collected, a modified Harvard step test was performed. In this test, the participants were asked to step up and down for five minutes. After 5 minutes, participants were asked to sit and measurements of heart rate and breathing rate. The participants were allowed to sit for another 5 minutes before repeating all measurements. Finally, participants were asked to take 1 puff of the inhaler and after five minutes, heart rate and breathing rate were measured for the last time.

Results

Asthmatic Participants

Non-asthmatic Participants

- HR and BR are measured in minutes. Time was kept using mobile stop watches.

The tables above show the heart rate and breathing rate measurements of six participants. The first three participants were asthmatic while the last three participants were non-asthmatic. Five procedures were undertaken for

the asthmatic participants and only three procedures for the non-asthmatic. For asthmatic participants, Salbutamol was taken before exercise and after exercise. The main purpose of integrating Salbutamol is to determine the effects of drugs on asthmatic patients. During this experiment, I was the time recorder while another member of the group gathered the data.

Information about participants

NOTE: The non-asthmatic participants, participants 4-5-6, were starting to get aggressive once they became tired, however the asthmatic participants. Participants 1-2-3 were more relaxed.

Discussion

Figure 2

Results for asthmatic participants show that prior to the start of exercise, during the first five minutes of rest, participant 2 has the highest heart rate with 108 beats per minute while participant 3 has the lowest with only 72 beats per minute. Five minutes after taking 1 puff of inhaler, only participant 2's heart rate increased to 120 bpm. Participant 3's heart rate remained the same while participant 1's heart rate decreased to 72 bpm. After the modified Harvard step test, all heart rate measurements of the three participants increased. Five minutes after the exercise, participant 2 had the lowest heart rate measurement. After taking inhaler Salbutamol for the last time, heart rate of participant 3 increased while heart rate of participant 2 decreased. Heart rate of participant 1 after taking Salbutamol for the last time simply stayed the same. As for the breathing rate, participant 2 had the highest breathing rate after the modified step test. Both participants 1 and 2

had the same initial and final breathing rate while participant 3's breathing rate decreased after the final measurement.

All non-asthmatic participants are of the same age. Prior to the start of exercise, participant 6 had the highest rate. After performing the modified step test, participant 5's heart rate increased tremendously from 78 bpm to 180 bpm. Five minutes after cooling down, all heart rate measurements decreased. As for breathing rate, participant 4 had the lowest breathing rate. After the step test, participant 4 also had the highest breathing rate. After cooling down, all three non-asthmatic participants had decreased heart rates.

Comparing the asthmatic participants, participant 2 has the highest increase in heart rate following the step test because she has a poor lifestyle. On the record, it shows that the second participant exercises only once a week. A sedentary lifestyle would usually require an individual to exert more effort and maximize more oxygen thereby increasing breathing and heart rate. During exercise, the cells in the body demand more oxygen, hence respiratory rate and heart rate increases. When there is increased in oxygen demand, the most efficient way to manage the needs is to breakdown glucose. This normally happens when one molecule of glucose and six molecules of oxygen combine to generate adenosine Triphosphate. The breathing rate increases because the body tries to facilitate the elimination of carbon dioxide and the oxygen level increase in the lungs. In the modified step test, when the participants were allowed to take their rest, the heart rate and breathing rate also slowed down because the body is no longer in need of high oxygen intake.

According to Gotshall (2006), asthmatic participants tend to have dilated airways when they are at rest hence when they perform exercises, there are only little change observed. Nonetheless, potent bronchodilator effects are in operation particularly during the exercises. Exercise stimulates narrowing of the bronchus by bringing huge volumes of air in the chest. When inhaling quietly, approximately one gallon of air goes to the lungs every minute (Levy et al, 2006). The air that goes to the lungs is warm and contains moisture added by the throat, nose, and mouth. As the air arrives in the bronchial tubes, the air will have the same moisture and temperature as the walls of the bronchi.

Salbutamol is a beta2-adrenoreceptor drug used as a stimulant. Salbutamol contains a relaxant effect on the smooth muscle of the bronchi hence it works best after exercise because it tries to ease the difficulty in breathing that asthmatic individuals would usually experience after the activity (Wong et al, 1990). Salbutamol causes the smooth muscles to relax through the increase of the intracellular cyclic adenosine monophosphate. When Salbutamol is taken, the uterine and bronchial muscles relax, heart rate increases, peripheral vessels dilate, and there are other metabolic effects. In the exercise, the inhaler worked in reducing the heart rate following the step test. By reducing heart rate, breathing rate also normalized. Hence, following the exercise, asthmatic participants were more relaxed compared to non-asthmatic participants. Side effects of Salbutamol include but not limited to the following: Dry mouth, headache, dizziness, and irritated throat, loss of appetite, heartburn, lightheadedness, altered taste sensation, nervousness, trembling, restlessness, anxiety, and sweating.

Age and gender, on the other hand, affects the maximal heart rate of an individual. As the person ages, the maximal heart rate also decreases (Kostis et al, 1982). This, however, does not entail that heart rate is also lower for older individuals. During normal activities, age does not affect heart rate. Poor lifestyle affects heart rate and breathing rate during exercise. With a body that is not used to exercising, participant 2's heart rate increased tremendously with only 5-minute step test.

Conclusion

Having performed the activity and gathering the results, we accept the hypothesis that Salbutamol works best in relaxing the lungs after the exercise. Salbutamol is a beta2-adrenoreceptor drug that relaxes the smooth muscles in the bronchi. Age does not affect heart rate during normal activities but tend to show the difference in values when maximal exercise heart rate is measured. Modified Harvard step test performed for 5 minutes was also effective in giving variations to measurements of heart rate and breathing rate of asthmatic and non-asthmatic participants.

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