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### The Effect of Zone 3 Physical Activity on Relax Heart Rate and Peak Flow Rate

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#### Abstract

The problem raised in this study is whether zone 3 physical activity affects peak flow rate and relaxed heart rate in FIK UNM students. At the same time, this study aimed to determine the effect of zone 3 physical activity on peak flow rate and relaxed heart rate in FIK UNM students. The type of research used is experimental research. The number of samples used as many as ten samples of students with a sampling technique using the purposive sampling method. Data collection techniques using peak flow rate test and heart rate test. The analysis technique used is descriptive analysis, normality test and paired sample test or influence test. From the data processing results on the effect of zone 3 physical activity on the Peak flow rate, a significant value of 0.001 was obtained, more diminutive than 0.05. So, zone 3 physical activity substantially affects the peak flow rate in FIK UNM students. Furthermore, it is known that the average peak flow rate before being given treatment is 416,000. This value has increased after being given treatment that is equal to 441,000. This indicates that the value of the vital lung capacity of students experienced a positive change. The results of data processing the effect of zone 3 physical activity, an open heart rate obtained a significant value of 0.000, more diminutive than 0.05. So, zone 3 physical activity substantially affects the available heart rate in FIK UNM students. Furthermore, it is known that the average value of open-heart rate before being given treatment is 86.2000. This value decreased after being given 80.2000 treatment. This indicates that the open heart rate of students also experienced a positive change.

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#### INTRODUCTION

Talking about health cannot be separated from how humans try to keep their bodies in shape and avoid things that can cause their resistance to drop, so they are

susceptible to disease (Jain & Ma, 2020). There is no doubt about the importance of health for humanity. Health is a precious thing in life (Hooper et al., 2020). We can carry out various activities easily if the body is healthy

and fit. In addition, a healthy body can bring a calm feeling and mentally awake.

For activities, health is an absolute thing owned by a person. Without health, humans cannot function normally. Sometimes, later when suffering from illness, a person realizes that health needs to be taken care of. A healthy body is sometimes not realized as something expensive (Kauh, 2020). Suppose people are aware that current medical expenses are costly. In that case, they even sacrifice their property to be able to recover, then rest assured that humans will do their best to keep their bodies healthy (Jansson et al., 2019).

Of the many vital organs possessed by humans, the heart and lungs are organs that need to be maintained in condition (Lukács, 2021). The heart functions to pump blood to all parts of the body. Where the pumped blood carries nutrients and oxygen needed by the body, muscles can work powerfully to pump blood throughout the body. The heart muscle tissue is also in prime condition so that the heart can pump up to 14,000 litres of blood per day. So if the heart is not treated correctly, the ability to circulate blood throughout the body will certainly not be optimal (Hambali & Suwandar, 2019). This can have an impact on the daily activities we carry out.

In addition to the heart, the next organ that needs to be kept healthy is the lungs. As we know, the lungs function to absorb the oxygen we breathe through the nose. The oxygen we breathe is what the body needs to support daily activities (Syafei et al., 2021). In

addition, the lungs also function to exchange carbon dioxide gas in the blood with oxygen. If the lungs are not treated properly, of course, we will experience problems with breathing. If this continues, the body will be deprived of oxygen. This, of course, can disrupt daily activities and can even cause lung-related diseases such as asthma and tuberculosis (Syafei et al., 2021).

Physical activity is any body movement caused by the work of skeletal muscles and increases the expenditure of energy and energy. There are three types of physical activity.

The first daily physical activity is in your daily life. Daily activities in taking care of the house can help you burn calories obtained from your food (Permadi et al., 2021). Such as washing clothes, mopping, walking, cleaning windows, gardening, ironing, playing with children, etc. The calories burned can be 50-200 kcal per activity (Nusi & Arbie, 2018).

While physical exercise is an activity carried out in a structured and planned manner, for example, walking, jogging, push-ups, stretching, aerobic exercise, cycling, etc., physical exercise is often categorized as sports (Nettleton & Hardey, 2006). Sport is defined as a structured and planned physical activity by following the applicable rules with the aim not only to make the body fitter but also to gain achievement and included in sports such as football, badminton, basketball, swimming, and so on (Čuljak et al., 2014; Kusuma, 2009). According to (Putra, 2019;

Syafei et al., 2021), regular physical activity will positively impact health. Some of the benefits that can be obtained if you regularly do physical activity are maintaining weight, reducing the risk of suffering from disease, tightening muscles and bones, and living longer.

According to Boroh, 2018 physical activities that can be done to maintain health and fitness levels are jogging, aerobic exercise, yoga, cycling, and body weight training. The lungs are an essential organ in the body consisting of bubbles (alveoli) (Kuswariet al., 2015; Zyl & Stander, 2015). If stretched, the alveoli can have a surface area of up to 90m<sup>2</sup>. In this layer, there is an exchange where oxygen (O<sub>2</sub>) enters the blood and carbon dioxide (CO<sub>2</sub>) is removed from the blood. The lungs are divided into the left and the right, the primary sites for gas exchange. Breathing consists of chest breathing, abdominal breathing, tissue breathing and lung breathing (Khasan et al., 2012).

The functional condition of the lungs is closely related to the ability to breathe. Lung capacity is the volume of air that can be exhaled after taking a deep breath. The maximum amount of air that can be inhaled and exhaled by the lungs is called the vital capacity of the lungs. The vital capacity of the lungs is the sum of the inspiratory reserve volume and the expiratory reserve volume. The vital capacity of a person's lungs varies according to age, height, weight and so on (Ariestika et al., 2021; Baskoro, 2016).

It can be said that the vital capacity of the lungs is closely related to the quality of the lungs. Knowing how vital our lungs are should also be followed by actions that enable us to take care of our lungs and, at the same time, prevent our lungs from something that can reduce the vital quality of our lungs. In physical education, lung capacity is a process that also involves the mechanism of the heart, blood vessels and blood (Ariestika et al., 2021; Ad'dien, 2011).

Several diseases can arise if you rarely do activities that can maintain heart performance. According to (Adrian, 2019; Markwald et al., 2013), several diseases related to the heart are coronary heart disease, heart attacks, arrhythmias and heart failure. Furthermore, according to (Adrian, 2019), several diseases can also increase the risk of heart disease, namely hypertension, diabetes, high cholesterol, a family history of heart disease, being overweight or obese, an unhealthy lifestyle such as smoking and rarely exercising, having a weakened immune system, for example, HIV infection, using immune system-suppressing drugs, or undergoing chemotherapy treatment. From the explanation about the heart organ, everyone should not ignore this one organ. One of the most recommended is regular physical activity so that the heart's performance is always optimal and has a positive impact on our daily performance. Of course, in doing physical activity, it is necessary to pay attention to the heart rate. Do not let the physical activity we do be included in the

strenuous activity. This, of course, will be detrimental to the body. Because instead of getting fit, it will hurt the heart (Nuttall, 2015).

## METHODS

The approach used in this study is quantitative. Meanwhile, the type of research used this time is experimental research (one group pretest-posttest design) (Ramadan & Juniarti, 2020). This study aims to determine the effect of physical activity on heart rate and lung capacity. The focus of the study was to determine the effect of physical activity in zone 3 on open heart rate (open heart rate and peak flow rate) in FIK UNM students. The population in this study were FIK UNM

students. The sample in this study was ten people. The sampling technique uses the Purposive Sampling technique. To retrieve maximum respiratory rate data (Peak flow rate) using a Peak Flow Meter (Fidhia, 2019) and to retrieve relax heart rate data (open heart rate) using an intelligent band/smartwatch that has a pulse measurement feature heart.

## FINDINGS AND DISCUSSION

### Findings

After going through the prerequisite test, namely the normality test, it was stated that the data distribution was normally distributed. The hypothesis was tested using the paired T-test method.

Table 1 Hypothesis test results

| Variable                          | N  | Mean    | Paired Mean | Sig   | $\alpha$ |
|-----------------------------------|----|---------|-------------|-------|----------|
| <i>Pre Test Peak flow rate</i>    | 20 | 416,000 | -25,000     | 0,001 | 0,05     |
| <i>Post Test Peak flow rate</i>   |    | 441,000 |             |       |          |
| <i>Pre Test Relax heart rate</i>  | 20 | 86,2000 | 6,000       | 0,000 | 0,05     |
| <i>Post Test Relax heart rate</i> |    | 80,2000 |             |       |          |

Based on the results of data analysis testing the Effect of Physical Activity Zone 3 on Peak flow rate and Relax heart rate in FIK UNM students, the results were obtained with the following details:

Test Results Analysis of the influence of physical activity zone 3, a Peak flow rate obtained a significant value of 0.001, more diminutive than 0.05. So, there is a significant

effect of zone 3 physical activity on peak flow rate in FIK UNM students. Furthermore, the table above shows that the average peak flow rate before being given physical activity treatment for zone 3 is 416,000. This value increased after being given zone 3 physical activity treatment, which was 441,000. This indicates that the value of the vital lung capacity of students experienced a positive

change marked by an increase in the average peak flow rate after giving zone 3 physical activity treatment.

Test Results Analysis of the influence of physical activity zone 3, a relaxed heart rate obtained a significant value of 0.000 which is smaller than 0.05. So, there is a significant effect of zone 3 physical activity on open heart rate in FIK UNM students. Furthermore, the table above shows that the average relaxed heart rate before being given the zone 3 physical activity treatment was 86.2000. This value decreased after being given zone 3 physical activity treatment, 80.2000. This indicates that students' relaxed heart rate value experienced a positive change marked by a decrease in the average relaxed heart rate value after giving zone 3 physical activity treatment.

## Discussion

The statistical analysis results showed a significant effect of zone 3 physical activity on Peak flow rate and Relaxed heart rate in FIK UNM students. If you look at the theories and frameworks discussed previously, the results of this study are by or support the theories that have existed before.

If you look at the data from the peak flow rate and relaxed heart rate, the results of research conducted both before being given treatment (Lippi et al., 2020; Lukács, 2021; Syafei et al., 2021), the average peak flow rate value of the sample is at normal status while the average relaxed heart rate value of the sample is in a relaxed state or is in zone 1 on

the heart rate meter. This means that the functional conditions of the lungs and heart conditions of the samples were in good condition before being given treatment (Ramadan et al., 2021). However, of course, if you see a significant effect after being given treatment in the form of zone 3 physical activity, then this indicates that the functional conditions of the lungs and heart conditions also need to be given an exercise so that they can always be at a good level of condition. Considering that most FIK UNM students are active in physical activities or sports, this is to the theory put forward by (Putra, 2019; Wallhead & O'sullivan, 2005), routine physical activity will have a tremendous impact on health. Some of the benefits obtained if you do regular physical activity are maintaining weight, reducing the risk of suffering from disease, tightening muscles and bones, preventing injury and falls, and living longer.

The study results on the effect of zone 3 physical activity on the peak flow rate, it is known that the value before being given treatment is 416,000, and this value is included in the normal category for a measure of functional lung conditions. However, after being given treatment, the peak flow rate increased to 441,000. This means that a given zone 3 physical activity can have a good effect on the performance of the lungs (Curtner-Smith et al., 2001). This means that the functional condition of the lungs can be further improved. Do not because you feel that your lungs are working well, then no effort is made

to maintain the functional condition of your lungs. This study showed that there was a significant improvement in the functional condition of the lungs after doing physical activity zone 3. This is in line with the theory (Bompa & Buzzichelli, 2018; Ichsani, 2015) that a decrease in lung capacity can result in restriction and obstruction. By always carrying out physical activity, exceptionally moderate physical activity, such as physical activity with a heart rate zone in zone 3, will reduce or even prevent the occurrence of lung disorders.

Furthermore, the results of research regarding the effect of zone 3 physical activity on open heart rate, it is known that the value before being treated is 86.2000. After being given treatment, this value decreased to 80.2000. This means a decrease in the average relaxed heart rate in each sample. This means that the given zone 3 physical activity can affect heart performance where the heart can work more optimally. A decrease in heart rates means the ability of the heart to pump blood more efficiently than before (Cunningham, Sagas, & Ashley, 2003).

As previously known, according to the theory put forward by (Vantorre, Chollet, & Seifert, 2014) that the heart rate zone when we do physical activity is divided into five zones, namely Zone 1, which is the sports zone with the lowest intensity and the heart rate is at numbers 104-114 bpm, zone 2 is a sports zone that is still categorized as low-intensity exercise, but slightly higher than zone 1 with a heart rate of 114-133, zone 3 is a sports zone that can be said to be the best zone to train our

sports and also our heart, this zone is at 133-152 bpm, zone 4 which can be said to be an intensity zone which includes high numbers with 152-172 bpm and zone 5 which is a red zone which is usually done less than 5 minutes where our muscles and breath will feel very heavy, the positive effect given is to train to breathe and also the muscles that are being trained.

Data before treatment showed that the pulse of the sample was already in the relaxed zone; no sample when measured in a calm condition, was above the relaxed zone. This means that the heart conditions of all samples are in good condition. But seeing a change in heart rate where the number of heart rates has decreased, means that the condition of the heart can still be trained so that it can work optimally and efficiently. Given that heart disease is one of the biggest killers of humans, it is only natural that we always make measured efforts so that our hearts are always in a healthy condition. This is under the theory (Adrian, 2019) that there will be several diseases related to the heart, namely coronary heart disease, heart attacks, arrhythmias, cardiomyopathy and heart failure.

Seeing the significant results of zone 3 physical activity on lung function and heart function, this zone 3 physical activity can be an option to keep the body healthy. Considering that zone 3 physical activity limits heart rate during activities, of course, this physical activity includes safe physical activity. It can also prevent us from excessive sports activities, which instead of providing

health to the body, actually cause new diseases.

## CONCLUSION

Based on the data analysis and discussion described above, it can be concluded that "there is a significant effect of zone 3 physical activity on peak flow rate and relaxed heart rate on FIK UNM students". It is shown by increasing the average value of lung functional ability and decreasing the average heart rate in FIK UNM students.

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