

# Effect Of Oxygen Levels In Drinks On The Acceleration Of Pulse Rate Reduction After Physical Activity

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## 1 Pengaruh Kadar Oksigen Dalam Minuman Terhadap Percepatan Penurunan Denyut Nadi Setelah Aktivitas Fisik

### 1 Effect Of Oxygen Levels In Drinks On The Acceleration Of Pulse Rate Reduction After Physical Activity

Wahyu Setia Kuscahyaning Putri<sup>1</sup>, Hilmy Aliriad<sup>2</sup>, Ahmad Fahrudi<sup>3</sup>, Laila Zanuba Arifia<sup>4</sup>

#### Abstrak

1 Penelitian ini bertujuan untuk menguji pengaruh pemberian air minum dengan kadar oksigen terhadap penurunan denyut nadi setelah aktivitas fisik pada mahasiswa Pendidikan Jasmani Kesehatan dan Rekreasi. Metode penelitian yang digunakan adalah penelitian eksperimen dengan desain Pretest-Posttest Control Group. Dua kelompok dibentuk, yaitu kelompok kontrol dan kelompok eksperimen, yang terdiri dari 20 mahasiswa Program Studi Pendidikan Jasmani Kesehatan dan Rekreasi UNUGIRI. Pengambilan sampel dilakukan secara acak (Random Sampling). Denyut nadi diukur sebelum dan sesudah aktivitas lari selama 20 menit. Hasil analisis menunjukkan bahwa terdapat perbedaan yang signifikan antara pemberian air minum beroksigen (kelompok eksperimen) dan air minum biasa (kelompok kontrol) terhadap percepatan penurunan denyut nadi setelah aktivitas lari. Nilai signifikansi diperoleh sebesar 0,057, menunjukkan perbedaan yang signifikan antara kedua kelompok tersebut. Rerata denyut nadi kelompok eksperimen sebesar 89,44, sedangkan rerata denyut nadi kelompok kontrol sebesar 98,33. Pemberian air minum dengan kadar oksigen memiliki pengaruh yang positif terhadap penurunan denyut nadi setelah aktivitas fisik. Subjek yang mengonsumsi air minum beroksigen setelah lari selama 20 menit mengalami penurunan denyut nadi yang lebih cepat dibandingkan dengan subjek yang hanya mengonsumsi air minum biasa. Simpulan penelitian ini menunjukkan bahwa pemberian air minum beroksigen memiliki pengaruh yang positif terhadap penurunan denyut nadi setelah aktivitas fisik pada mahasiswa Pendidikan Jasmani Kesehatan dan Rekreasi. Penggunaan air minum beroksigen dapat menjadi alternatif yang efektif untuk mempercepat pemulihan denyut nadi setelah aktivitas fisik intens. Penelitian ini memberikan pemahaman yang lebih baik tentang manfaat air minum beroksigen dalam menjaga kesehatan dan mempercepat pemulihan fisik setelah aktivitas olahraga.

1 Kata Kunci : air minum beroksigen, penurunan denyut nadi, aktivitas fisik

#### 15 Abstract

This study aims to examine the effect of drinking water with oxygen levels to decrease the pulse rate after physical activity in students of Physical Education Health and Recreation. The research method used is experimental research with Pretest-Posttest Control Group Design. Two groups were formed, namely a control group and an experimental group, consisting of 20 students of the UNUGIRI Health and Recreation Physical Education Study Program. Sampling is done randomly (Random Sampling). The pulse rate is measured before and after running for 20 minutes. The results of the analysis showed that there was a significant difference between the provision of oxygenated drinking water (experimental group) and ordinary drinking water (control group) on the acceleration of pulse rate reduction after running activities. The significance value obtained was 0.057, indicating a significant difference between the two groups. The average pulse of the experimental group was 89.44, while the

average pulse of the control group was 98.33. The administration of drinking water with an oxygen content has a positive effect on the decrease in the pulse rate after physical exertion. Subjects who consumed oxygenated drinking water after a 20-minute run had a faster decrease in pulse rate compared to subjects who consumed only plain drinking water. The conclusion of this study shows that the provision of oxygenated drinking water has a positive effect on the decrease in pulse rate after physical activity in health and Recreation physical education students. The use of oxygenated drinking water can be an effective alternative to accelerate pulse recovery after intense physical exertion. This research provides a better understanding of the benefits of oxygenated drinking water in maintaining health and accelerating physical recovery after sports activities.

**Keywords :** oxygenated drinking water, decreased pulse, physical activity

## INTRODUCTION

Physical activity has many health benefits, including improving cardiovascular fitness, strengthening muscles, improving energy balance, and maintaining a healthy weight (Aliriad, Priadana, et al., 2023; Aliriad, Soegiyanto, et al., 2023). When doing physical activity, the body needs enough oxygen to meet energy needs. Oxygen plays an important role in the process of aerobic respiration, in which nutrients are converted into energy needed by the body's cells (Franklin et al., 2022; White et al., 2013). The pulse rate, which is the number of heartbeats per minute, is an important indicator for evaluating a person's cardiovascular activity and fitness level. A high pulse after physical exertion signals a stress on the cardiovascular system and the need for a longer recovery. Therefore, lowering the pulse to normal after physical exertion is important in the recovery process of the body.

During physical activity, the body produces energy by converting glucose into ATP (adenosine triphosphate) through aerobic respiration (Choi et al., 2021; Netzer et al., 2023). However, if the need for oxygen is not met, such as during intense physical activity, the body will switch to anaerobic respiration. Anaerobic respiration produces ATP without the need for oxygen, but produces lactic acid as a by-product. The accumulation of lactic acid in the muscles can lead to fatigue and increased pulse.

Oxygenated drinks have become increasingly popular drinks among athletes and physically active people (Pratama & Bafirman, 2020). This drink is claimed to increase the supply of oxygen to the body's cells, accelerate recovery, and improve physical performance. In oxygenated beverages, oxygen is dissolved in water at a certain pressure and temperature, thus allowing oxygen to be more easily absorbed by the body.

Intense physical activity can lead to increased oxygen demand in the body (Krismawati et al., 2019; Sumantri, 2021). Oxygenated drinks have become increasingly popular drinks among athletes and physically active people (Pratama & Bafirman, 2020). This drink is claimed to increase the supply of oxygen to the body's cells, accelerate recovery, and improve physical performance. In oxygenated beverages, oxygen is dissolved in water at a certain pressure and temperature, thus allowing oxygen to be more easily absorbed by the body.

Intense physical activity can lead to increased oxygen demand in the body (Krismawati et al., 2019; Sumantri, 2021). Adequate oxygen levels are important to maintain the health of the body and ensure the proper functioning of the organs. However, after physical exertion, the body needs time to recover and return the pulse to a normal level. In this context, it is necessary to investigate whether the administration of drinks with oxygen levels can accelerate the process of lowering the pulse rate after physical exertion.

Humans need oxygen for the body's respiratory and metabolic processes. Oxygen in the body can be met through the normal breathing process, but oxygen levels in the body can be reduced during physical activity (Almy & Sukadiyanto, 2014). Physical activity leads to a decrease in fluid in the body, and the body tries to balance the temperature due to the energy expended. Lack of oxygen during physical activity converts aerobic respiration into anaerobic respiration, which triggers the heart to work faster to deliver oxygen and nutrients to organs in need.

Lack of body fluids can also occur during physical exertion, which can lead to dehydration. Dehydration can impair concentration, reaction speed, increase body temperature, and slow down energy production. Even a lack of water as much as 1% of body weight can affect the brain and thinking ability, while a lack of fluid as much as 2% can weaken the ability to think short-term, focus, and memory. It is important to balance body fluids after physical activity, and the easiest way to do this is to drink mineral water. However, there is a special type of drinking water called oxygenated drinking water. Oxygenated drinking water has been prepared in such a way that more oxygen is bound in it. Oxygenated drinks are known to have a higher oxygen content than ordinary drinking water, about 7-10 times.

Based on this background, the problem that arises is whether the administration of drinks with oxygen levels can affect the acceleration of the decrease in the pulse rate after

physical exertion in individuals. Are drinks with oxygen levels more effective in accelerating pulse recovery than regular drinks after physical exertion?. Several previous studies have explored the effects of oxygenated beverages on sports performance. Oxygenated drinks can accelerate the decrease in pulse after physical exertion compared to regular drinks (Sulaeman, 2022).

The results of the study showed the potential benefits of oxygenated drinks in helping the body recover faster after physical activity. Previous research has shown that oxygenated drinking water can have a positive effect on oxygen supply throughout the body, dissolving nutrients, and distributing them throughout the body. Oxygenated drinking water has a higher oxygen content compared to ordinary drinking water (Budiman & Ray, 2021; Muhyi, 2015). Lack of body fluids after physical activity can lead to dehydration, which negatively affects concentration, reaction speed, body temperature, and energy production (Bahri et al., 2012; Samudera & Ashadi, 2019). Therefore, it is important to balance body fluids after physical activity.

This study aims to determine the effect of oxygen levels in beverages and test the provision of beverages to accelerate the decline in pulse rate after physical activity in health and Recreation physical education students. This study will test whether the administration of drinks with oxygen levels can accelerate the recovery of the pulse after physical activity. It is hoped that this study can provide a better understanding of the benefits of oxygenated drinking water in maintaining health and accelerating physical recovery after sports activities.

## METHODS

The research method used in this study is experimental research with Pretest-Posttest Control Group Design (Andriani et al., 2017). The research method used in this study is experimental research with Pretest-Posttest Control Group Design (Andriani et al., 2017). This design involves the division of research subjects into two groups, namely the control group and the experimental group. The purpose of using this design was to compare the effect of administering drinks with oxygen levels on the decrease in pulse after physical activity between the two groups. The research subjects in this study were students of Physical Education Health and Recreation program UNUGIRI as many as 20 people. Sampling was carried out using the Random Sampling technique, in which

subjects were randomly selected from the population in accordance with the inclusion criteria of the study.

The study procedure began with Pulse measurements in all subjects before running for 20 minutes. After that, the subjects were divided into two groups at random. The control group will be given ordinary drinking water, while the experimental group will be given oxygen-containing drinking water. Once the drink is administered, all subjects will be rested for 5 minutes to allow time for the body to react to the drink consumed. After rest, the pulse rate will be measured again in both groups. The recorded Pulse Data will be analyzed using statistical methods. Descriptive calculations will be performed to see the average value of the Pulse before and after physical activity in each group (Sandi, 2016). In addition, inferential statistical calculations will also be performed to test for significant differences between the control group and the experimental group.

The difference analysis will use the significance value (p-value) as a measure to determine whether the difference between the two groups is statistically significant. If the p-value is less than the previously determined significance level, it can be concluded that there is a significant difference between the administration of drinks with oxygen content and ordinary drinking water to a decrease in the pulse rate after physical exertion.

The method of this study was designed to test the hypothesis that the administration of drinks with oxygen content can accelerate the decrease in pulse rate after physical exertion. Using a robust experimental study design, it is hoped that the results of the study can provide a clearer understanding of the effect of oxygenated beverages on pulse and recovery after physical activity.

## RESULTS

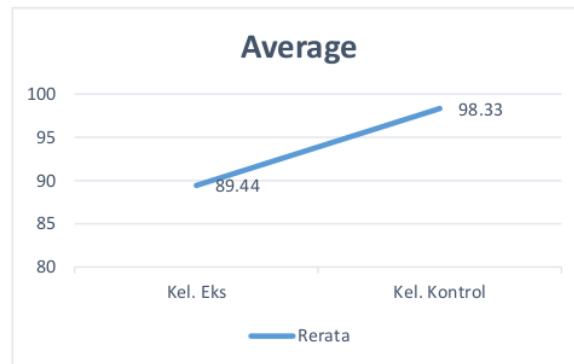
The results of descriptive calculation analysis showed that there was a significant difference between the provision of oxygenated drinking water (experimental group) and ordinary drinking water (control group) on the acceleration of Pulse reduction after running for 20 minutes in UNUGIRI Health and Recreation physical education students. The value of significance (p-value) obtained by 0.057 indicates that the difference has almost reached the level of significance previously determined.

Table 1 shows the results of the analysis of differences between the two groups. The experimental group given oxygenated drinking water had an average pulse rate of

89.44, while the control group given plain drinking water had an average pulse rate of 98.33. There was an average difference of 8.89% between the two groups.

**Table 1. Analysis Of Differences**

	N	Group	Mean	Difference	Sig.
Pulse rate	10	Ex.Experiments	89,44	8,89	0,057
	10	Ex. Control	98,33		



**Figure 1.** Difference Between Ex. Experiments and ex. Control

Figure 1 illustrates the mean difference between the experimental and control groups. Graph Data showed that the administration of beverages with oxygen levels had a significant effect on pulse rate reduction in UNUGIRI Health and Recreation physical education students. The average pulse rate of the experimental group (89.44%) was lower than the average pulse rate of the control group (98.33%). This study also involved several related variables that need to be considered. The independent variable in this study was the type of drink given, namely oxygenated drinking water and ordinary drinking water.

The dependent variable is a decrease in the pulse rate after 20 minutes of running activity. In addition, factors such as gender, age, and fitness level of the subject can also be confounding variables that need to be taken into account in the analysis of the results. The results of this study support the hypothesis that the administration of drinks with oxygen levels can accelerate the decrease in pulse after physical exertion. Oxygenated drinks are believed to provide more additional oxygen in the body, thereby

speeding up recovery and reducing the time it takes to return to a normal pulse after intense physical activity. However, it should be borne in mind that the obtained significance value (0.057) is close to the previously specified significance level. Therefore, the results of this study need to be further confirmed with further studies involving a larger number of subjects and taking into account disruptive factors that may have influenced the results. Overall, the study provides interesting preliminary evidence on the effect of oxygenated beverages on decreased pulse rate after physical activity. These results may provide a better understanding of the importance of oxygen in the recovery of the body after physical activity and provide practical implications in the field of sport and health.

## DISCUSSION

Based on the results of research on the provision of oxygenated beverages, the decrease in pulse rate can be faster because of the additional oxygen supply that helps in the recovery of the body (Yulianto et al., 2022). <sup>17</sup> The results of this study are also consistent with previous findings linking physical activity to a decrease in pulse rate. Intense physical activity can increase the pulse rate as the body's response to increased oxygen demand (Satria et al., 2023). Previous studies have shown that oxygenated beverages can improve oxygen supply throughout the body (Netzer et al., 2023). This can provide additional benefits for the respiratory process, muscle recovery, and decreased pulse rate after physical activity (Budiman & Ray, 2021). The higher oxygen content in oxygenated beverages allows oxygen to be more effectively transported into the blood and distributed throughout the body (Awwal, 2019; Muhyi, 2015). As a result, the body's recovery processes can be accelerated, so the pulse can return to normal levels more quickly.

Research results have also shown that a faster decrease in pulse rate after physical activity may be associated with improved cardiorespiratory fitness (Andrastea et al., 2018). By consuming oxygenated beverages that accelerate the decrease in Pulse, individuals can optimize their exercise and obtain greater health benefits. In the context of Health and Recreation physical education students, improved cardiorespiratory fitness can provide an advantage in carrying out their duties and responsibilities as aspiring professionals in the field of sports and health.

The use of oxygenated drinking water can also be an attractive alternative for individuals who have difficulty in meeting their body's oxygen needs (Kusuma, 2020;



Tirajoh et al., 2016). For example, individuals with certain health conditions or who live in areas with poor air quality may face challenges in getting enough oxygen through regular breathing. In this case, oxygenated drinks can be a useful option to obtain the additional oxygen supply needed by the body.

The influence of the administration of oxygenated drinks on the decrease in the pulse after physical exertion has different needs. Factors such as age, gender, fitness level, and health conditions can influence the body's response to oxygenated beverages (Knowles et al., 2018; Kurniawan et al., 2020). Therefore, consult a health professional before adopting the use of oxygenated beverages as part of your exercise or recovery routine.

Overall, the results of this study provide a deeper understanding of the effect of giving drinks with oxygen levels on the decrease in pulse rate after physical activity. By speeding up the body's recovery process, oxygenated drinks can be a strategy that has the potential to improve exercise performance, speed recovery, and improve overall well-being. However, more research is needed to corroborate these findings, elucidate the mechanisms involved, and identify the populations that most benefit from the use of oxygenated beverages.

## CONCLUSION

The administration of drinks with oxygen content has a significant effect on the acceleration of the decrease in the pulse rate after physical exertion. Subjects who consumed oxygenated drinking water had a faster decrease in Pulse compared to subjects who consumed only plain drinking water. Supplemental oxygen administration through oxygenated beverages helps improve oxygen supply throughout the body, accelerate muscle recovery, and optimize cardiorespiratory performance. This research makes an important contribution in enriching our understanding of the benefits of oxygenated beverages in the context of physical activity. The use of oxygenated drinks can be an interesting alternative for individuals who want to speed up their body's recovery after exercise.

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