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## Analysis of Cardiopulmonary Endurance of Basketball Athletes Coached by Gayo Lues Regency

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### Abstract

**Objectives.** This research aims to discover the description of cardiopulmonary endurance in basketball athletes trained by the Gayo Lues district, which will be carried out in 2023. This research is classified as quantitative research using a field test and measurement approach to components of cardiopulmonary endurance.

**Materials and Methods.** The population in this study were all basketball athletes trained by the Gayo Lues district, totaling 23 athletes consisting of 10 male athletes and 13 female athletes who were taken using saturated sampling techniques. Data collection was carried out using the Harvard step test instrument. The data is then analyzed using average statistical analysis and frequency or percentage distribution analysis.

**Results.** The research results found that the cardiopulmonary endurance ability of male athletes had an average value of 70.1 and was in the medium category. For female athletes, cardiopulmonary endurance was found to be 65.7 and was in the medium category.

**Conclusion.** Based on the research findings, it can be concluded that the cardiopulmonary endurance ability of basketball athletes trained by Gayo Lues district, both male and female athletes, is still in the medium category.

**Keywords:** Cardiopulmonary Endurance, Basketball.

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### Introduction

Sports coaching has changed a lot in recent times. Advances in science and technology have led to better quality coaching and more advanced sports achievements. Sports development has become an important goal in society, covering almost every aspect of communities. Nowadays, sports coaching is widely available across regions and communities

in Indonesia, and it has become an integral part of social life. Due to the rise of technology, people are less active, which has led to an increased demand for sports coaching in the wider community (Budiman & Ruslan Rusmana, 2021)

Physical ability is a component that every athlete needs in sports development. Physical ability can be interpreted as the ability of an athlete or person to carry out a performance that involves maximum muscle quality and other physiological components. This is in line with what was said by (Budiwanto, 2012) that "Physical formation is the most important factor in a training program that aims to achieve high abilities". Therefore, in developing sports achievements, attention to improving the physical components of athletes is one of the main priorities that must be paid attention to. This aims to ensure that athletes maximize their abilities in every component and aspect required in this sport.

According to experts, physical abilities are closely related to the quality of a person's bodily movements. According to experts, there are ten components consisting of endurance, strength, speed, and several other components. These physical components play a crucial role in improving the quality of the human body's work in carrying out specific movement task patterns. Having suitable physical components in each person will help protect or prevent someone from the possibility of injury when carrying out a movement task (Kljajević et al., 2021). Therefore, the fitness or physical condition component is very closely related to coaching in sports, especially in coaching branches that lead to achievement. This is because each branch of sport has different physical component requirements according to the characteristics of the branch itself.

Basketball is a type of big ball game requiring every athlete to have good and capable physical components. This is because basketball is a sport that requires several main components, such as cardiorespiratory endurance, speed, agility, and several other components. This is because basketball is a sport with the high-intensity movement of players over a relatively long period. Basketball is also a sport with high intensity and is quite popular and predominantly uses the lower extremities (François et al., 2022). Based on this explanation, it is obvious that the sport of basketball requires suitable supporting physical components for each athlete or player. Without these components, athletes cannot carry out optimal playing patterns and win matches by defeating their opponents.

The cardiopulmonary endurance component is a physical component needed in almost every sport except basketball. The cardiopulmonary endurance component is a component that describes the quality of the work of a person's or athlete's heart and lungs in performing or

carrying out a performance over a relatively long period. Cardiopulmonary endurance is a physical component that underlies the development of other components in the training process. In line with that, (Tamara & Nurrochmah, 2017) explain that "cardiopulmonary endurance is related to the quality of the work of the heart and lungs in supplying oxygen through the blood throughout the body to be able to produce energy that muscles can use to complete a movement task for a long time. "In line with that, (Zulheri Is & Septi Hariansyah, 2020) also said "Endurance, or in this case cardiopulmonary endurance, is a condition in which a person's body can carry out a certain performance for a long time and avoid significant fatigue. ". Based on this explanation, it can be described that new cardiac endurance or cardio-respiratory *endurance* is a physical component that describes a person being able to carry out various movement tasks well for a long time and the athlete can avoid excessive fatigue.

Basketball players trained by Gayo Lues Regency aim to achieve success in regional and national matches. However, some players have shown problems related to their physical abilities and playing patterns. Specifically, the cardiopulmonary endurance of each athlete trained by Gayo Lues district in basketball is not optimal. To improve the training patterns of coaches, researchers need to analyze the cardiopulmonary endurance of these players. This will help athletes to better prepare and mature in facing upcoming matches. Researchers suspect that there are deficiencies in the physical components of the players, hence an analysis is necessary to find a description of the physical components of cardiopulmonary endurance in basketball players trained by Gayo Lues Regency.

## **Materials and Methods**

### ***Study Participants.***

The population in this study focused on all basketball athletes coaching in the Gayo Lues district, totaling 23 people. Based on the population size in this study, sampling was carried out using a saturated sampling technique approach (Ahyyar et al., 2020). So, the sample in this study was 23 athletes consisting of 10 male athletes and 13 female athletes.

### ***Study Organization.***

This research aims to describe the physical components of cardiopulmonary endurance in basketball athletes assisted by PERBASI Gayo Lues Regency. For this reason, this research is a type of quantitative research that uses an evaluation approach through tests and measurements of the components of the physical condition of cardiopulmonary endurance in basketball. Data was collected using a test and measurement instrument for cardiopulmonary endurance, namely the Harvard step test (Mackenzie, 2008).

***Statistical analysis.***

The data that has been obtained is then analyzed using simple statistical analysis, namely average analysis and frequency distribution analysis.

**Results**

Our research involved using the Harvard step test instrument to collect data and analyze it using basic statistical methods. The results we obtained can provide valuable insights into the subject we are studying.

**Table 1.** Cardiopulmonary endurance test results for male athletes.

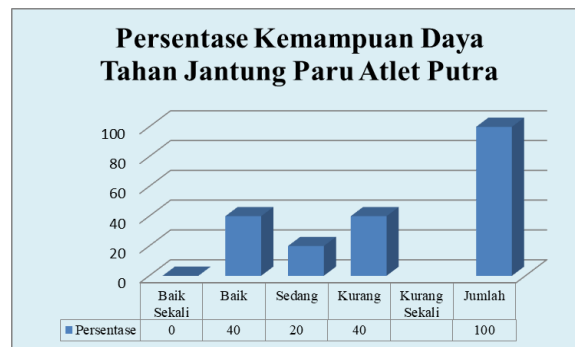
<b>Sample</b>	<b>Results</b>	<b>Category</b>
N1	82	Good
N2	86	Good
N3	74	Currently
N4	68	Currently
N5	85	Good
N6	56	Not enough
N7	55	Not enough
N8	84	Good
N9	55	Not enough
N10	56	Not enough
Amount	701	
Average	70.1	Currently

**Table 2.** Cardiopulmonary endurance test results for female athletes.

<b>Sample</b>	<b>Results</b>	<b>Category</b>
N1	61	Currently
N2	78	Currently
N3	70	Currently
N4	80	Good
N5	52	Not enough
N6	76	Currently
N7	50	Not enough
N8	52	Not enough
N9	67	Currently
N10	70	Currently
N11	67	Currently
N12	72	Currently
N13	59	Not enough
Amount	854	
Average	65.7	Currently

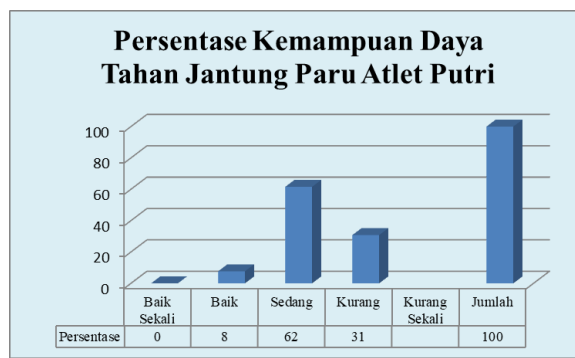
By utilizing the SPSS software to analyze the data, we can gain a better understanding of the percentage of cardiopulmonary endurance ability in male basketball athletes. A visual

representation of this analysis can be found in the image below, providing a more detailed and comprehensive view of the athletes' physical capabilities.



**Figure 1.** Percentage of male athletes' cardiopulmonary endurance capabilities

Source: Author



**Figure 2.** Percentage of female athletes' cardiopulmonary endurance capabilities

## Discussion

The research found that there is a problem related to cardiopulmonary endurance in basketball. Both sample groups had a moderate level of physical components related to cardiopulmonary endurance. However, this falls short of what is expected in basketball sports when considering the development of sports accomplishments. This is also in line with what (Song & Tuo, 2022) said, "Competitive sports always follow three big principles, which means that every athlete needs good physical components and is supported by other components."

As is known, the physical component is necessary in coaching sports, especially in branches that are coached to achieve achievements at both regional and national levels. Physical abilities will be closely related to how a person can maximize physiological and non-physiological potential related to the branch he is pursuing. Physical ability several experts also say that this component is closely related to the athlete's ability to produce high abilities (skills) (Budiwanto, 2012). The cardiopulmonary endurance component, or what is often referred to as VO2max, is a physical component that describes a person's ability, or in this case, a basketball athlete, to carry out a movement task that involves several muscle groups, both large and local

muscles, to be able to work for a relatively long time. Apart from that, the cardiovascular endurance component is also related to the ability of the pulmonary heart to supply oxygen through a cardiovascular physiological mechanism so that each working muscle component has a good and balanced energy supply. Cardiopulmonary endurance is also closely related to the heart, lungs, and blood circulation when carrying out activities repeatedly over a long period without causing significant fatigue (Lahinda et al., 2020).

Physical condition components can only be improved through a systematic, measurable, and well-structured training process. The physical component approach cannot be carried out in a short or constant time. However, it must go through a relatively long process and be carefully considered by all parties, both athletes and coaches. The cardiopulmonary endurance component, as one of the essential components that exist and is required by the sport of basketball, in principle, requires quite a long time to develop compared to other essential physical components (Freitag et al., 2018). If observed from an understanding point of view, it explains that cardiopulmonary endurance is identical to the performance of the heart and lungs in supplying oxygen throughout the body through the blood to work for a long time. Therefore, the training process must also go through a long duration of training.

In general, endurance is divided into two groups, namely cardiopulmonary endurance, which is related to the quality of the performance of the heart and lungs in supplying oxygen to produce energy that can be used by the body through the muscular system to work for a long time and muscle endurance which is related to the ability a muscle or group of human muscles to perform a movement task well for a long time without experiencing excessive fatigue.

Several things say that to achieve achievement in coaching a sport, you must have suitable physical components supported by good tactical and mental technical abilities (Bompa & Haff, 2009). Therefore, it is hoped that in the future, it is essential to pay attention to improving physical components, especially those related to cardiopulmonary endurance. This aims to ensure that every athlete can maximize their potential in carrying out activities or movement tasks well (Rozi et al., 2021). Of course, increasing the cardiopulmonary endurance component can only be done through systematic and regular training. Of course, this training can only be carried out with the support of various components related to science, technology, facilities, and infrastructure, as well as high enthusiasm from both the athletes and the coaches or coaches.

Based on the explanation above, if you look at the results found through this research regarding the description of the cardiopulmonary endurance components found in athletes

trained by the Gayo Lues district, both male and female athletes are still in the medium category. Of course, this is still far from expected for sports achievements. Based on the researcher's observations, several things cause this condition to occur, one of which is the cause of low cardiopulmonary endurance in athletes trained by the Gayo Lues district in the basketball branch is the lack of adequate training facilities and infrastructure that athletes and coaches can use to improve the components of their training. Physical components required in playing basketball. Apart from that, the support from parents or people around the athlete has not been optimal in supporting the coaching process carried out so far due to the lack of public response to the importance of coaching activities in sports.

### Conclusions

Based on the problems described above and referring to the results of tests and measurements using the *Harvard step test instrument* and analyzed using simple statistical analysis, a conclusion can be drawn to answer the above problem, namely: cardiopulmonary endurance ability in male basketball athletes assisted by Gayo district Lues is in the medium category with an average score of 70.1. Furthermore, the cardiopulmonary endurance ability of female basketball athletes assisted by the Gayo Lues district is also in the medium category, with an average score of 65.7.

### Acknowledgment

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### Conflict Of Interest

The author declares that there is no conflict of interest of any kind.

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