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Analysis of Cardiorespiratory Endurance Levels of High School Futsal Teams

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Abstract

This study aims to find out how good the cardiorespiratory endurance level of the SMA Negeri 22 Makassar futsal team is. This research is a quantitative descriptive research, the test technique used to collect data is the *Multistage Fitness Test*. The population in this study was 25 futsal team players at SMA Negeri 22 Makassar, the sample to determine the population used *purposive sampling*. The data analysis technique used is descriptive statistics in the form of percentages. The prevalence of "fair" (moderate) fitness levels among players under the age of 18 in the futsal team of SMA Negeri 22 Makassar indicates the need for a targeted training program to improve their cardiorespiratory endurance. With 62.5% of respondents falling into this category, this shows the potential to increase their fitness levels to achieve better performance on the field. Identifying factors contributing to lower fitness levels among the 37.5% of players categorized as “poor” (poor) may provide valuable insight for developing personalized training interventions and plans to meet their specific needs. By addressing these fitness gaps, teams can potentially improve their overall performance and competitiveness in futsal tournaments. A sufficient level of cardiorespiratory endurance is important in the sport of futsal, which involves fast movements, sudden changes in direction, and high intensity. By having a sufficient level of cardiorespiratory endurance, SMA Negeri 22 Makassar futsal players can maintain their performance during matches, reduce fatigue and minimize the risk of injury.

Keywords: Endurance, Cardiorespiration, Futsal, Students.

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Author's Contribution: a) Research Design; b) Data Collection; c) Statistical Analysis; d) Manuscript Preparation; e) Fund Collection

A. Introduction

Everyone has different physical activities, so physical fitness levels also vary. People who are active in carrying out physical activities tend to have a higher level of physical fitness than those who are less active, because more physical activity can improve a player's physical fitness (Fatoni et al., 2021). Players who have good physical fitness will be able to carry out daily life without getting tired, and still have the ability to continue other work (Prasetyo & Winarno, 2019).

Physical activities that can improve physical fitness include running, cycling, swimming, joining a fitness club and participating in sports, one of which is futsal. Players who play futsal are required to have a higher level of physical fitness than ordinary people, because futsal is a sport with a fairly long match duration so players must have a high level of physical fitness (Warsono et al., 2017). The role of futsal teachers and coaches is very important, the task given is not only to train but also to educate, teach, facilitate, serve, design and manage.

Futsal is a ball game played by two teams, each consisting of five people (Prasojo et al., 2015; Suryadi & Rubiyatno, 2022) (Gómez et al., 2019). The duration of a futsal sport match is 40 minutes in 1 match. In 1 match, it is divided into 2 halves, each 20 minutes, the aim of which is to put the ball into the opponent's goal. so futsal must have all the components of a physical fitness level, namely: endurance, strength, speed, agility, balance, coordination and more flexibility than ordinary people in general (Franji & Abady, 2022).

Of these components, a futsal player must improve all of them. The way to improve physical fitness in futsal players is not just to practice for one or two days, but must be trained every day, so that a futsal player has better physical fitness (Madjid, 2017). Both during matches and in other activities. However, there is a lack of awareness of the importance of physical fitness for futsal players at SMA Negeri 22 Makassar, this can be shown by the players' achievements.

Based on an interview with the futsal team coach of SMA Negeri 22 Makassar, namely Coach Fitrah, since 2021, there are still many players, especially on the futsal team of SMA Negeri 22 Makassar, who do not yet know their level of cardiorespiratory endurance. Players are also less aware of the importance of their cardiorespiratory endurance. The level of cardiorespiratory endurance of futsal players can be seen during the match, many players easily get tired in the middle of the match, so a good level of physical

fitness is needed, including explosive power, muscle strength and good endurance (Wirajaya et al., 2022).

Apart from that, training equipment is also still limited. So training to increase endurance is rarely done, this causes the players' training to not work optimally. Many players also carry out school activities until they are exhausted, such as taking part in required extracurricular activities and cross-school interests, so that players do not have more time to participate in training activities.

Based on the problems above, the author wants to know the level of cardiorespiratory endurance of futsal players at SMA Negeri 22 Makassar. To produce high performance, a futsal player must have a good level of physical fitness, one of which is cardiorespiratory endurance.

Knowing the level of cardiorespiratory endurance of futsal players at SMA Negeri 22 Makassar has significant urgency and novelty. A good level of physical fitness, including cardiorespiratory endurance, is an important factor in achieving high performance in futsal. In this context, cardiorespiratory endurance refers to the body's ability to produce energy efficiently during physical activity involving the cardiovascular and respiratory systems.

The urgency of this knowledge lies in a better understanding of the physical condition of futsal players at SMA Negeri 22 Makassar. By knowing their level of cardiorespiratory endurance, coaches and medical staff can design appropriate training programs to improve a player's cardiorespiratory fitness. This will help players maintain their performance during matches, reduce fatigue and minimize the risk of injury.

The novelty of this research lies in its focus on futsal players at SMA Negeri 22 Makassar. Although much research has been conducted on cardiorespiratory endurance in the context of sport, research specific to futsal players at the high school level is limited. Therefore, the results of this test can provide new insight into the level of physical fitness of futsal players at SMA Negeri 22 Makassar and form the basis for further research in this field.

In order to achieve high performance in futsal, players need to have a good level of physical fitness, including cardiorespiratory endurance. By understanding the cardiorespiratory endurance level of futsal players at SMA Negeri 22 Makassar, appropriate steps can be taken to improve their cardiorespiratory fitness, which in turn will help them achieve better performance in this sport.

B. Method Study

This research is a quantitative

descriptive study of the level of cardiorespiratory endurance of the SMA Negeri 22 Makassar futsal team. The data collection technique uses *Bleep test/Multistage fitness test.*

The population is all individuals intended to be investigated, Population is the number of people or individuals who have at least one characteristic in common. In the context of research or data analysis, population refers to the entire group that wants to be studied or explained. According to (Azwar, 2016), the research population is a group of subjects who wish to generalize the research results. The population to be studied is 25 players and purposive sampling is used. According to (Sugiyono, 2015) Purposive sampling is a technique for determining samples with certain considerations in accordance with the objectives of the research or analysis being carried out.

In purposive sampling, researchers or decision makers deliberately select samples that are considered most relevant or representative of the population they wish to study. The results of the cardiorespiratory endurance test from 16 samples of male futsal players under the age of 18 at SMA Negeri 22 Makassar can provide an idea of the level of cardiorespiratory endurance of futsal players at that school.

The variable in this study is a single variable, namely the level of cardiorespiratory endurance of the SMA Negeri 22 Makassar futsal team. The operational variables in this research are as follows:

1. Endurance referred to in this research is the body's ability to resist fatigue during physical activity or exercise.
2. Cardiorespiration referred to in this research is the ability of the organ
   The body's heart and lungs absorb and distribute oxygen throughout the body so that it can carry out daily activities without experiencing significant fatigue.
3. The futsal team referred to in this research is the futsal players who are members of the futsal team at SMA Negeri 22 Makassar.

This study used a cardiorespiratory endurance test instrument to collect research data. The instrument used in this research is the multistage fitness test.

According to (Pamungkas et al., 2022), endurance can be measured using a multistage fitness test. Researchers chose this test compared to other test instruments because the purpose of this test is to measure cardiorespiratory endurance. According to (Ratnasari, 2018), because endurance is important and to fight fatigue that arises in carrying out bodily activities. Fatigue that arises due to lack of endurance will affect the nerves, concentration,

courage will disappear, and finally awareness of movement will disappear too.

a. Tools that need to be used to carry out the test:
   1. The track is 20 meters long.
   2. Tape recorder and rhythm multistage fitness test.
   3. Stationery.
   4. Test form for multistage level fitness test.

b. Instructions for carrying out the test:
   1. Samples prepare behind the starting line.
   2. The tape recorder is played and the athlete starts running to the rhythm of the tape recorder.
   3. Samples taking this test cannot be late twice, if they are late twice then the sample is considered to have failed at that level.
   4. Each sample is tested once and the sample stops at what level.

According to Cooper in (Iriawan, 2015) stated that "the instrument that will be used for this test is *Bleep test / Multistage fitness test* with a validity of 0.785". According to Chatterjee et al in (Iriawan, 2015) states that "the reliability used is 0.81".

Figure 1. *Bleep Test* Tracks
Source: (Yusriyah, nd)

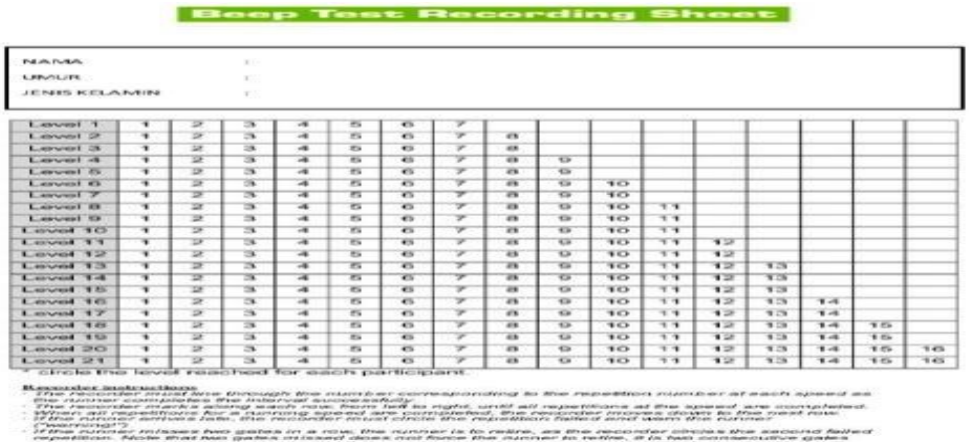


Figure 2. Bleep Test Form

Source: (Iriawan, 2015)

The collection technique used in this research is as follows:

1. Researchers prepare tools that will be used during research
2. Researchers come on site to conduct research.
3. Researchers make preparations at the research site.
4. The researcher met with the research sample, then the researcher explained the procedures for carrying out thetest.
5. Researchers carried out a series of tests on the futsal team of SMA Negeri 22 Makassar who were assisted by three people, the first person helped guard the tape recorder, the second person guarded the dividing line, the third person supervised the samples in filling in the Multistage fitness test formula. Researchers monitor if there are samples that are twice late in carrying out the Multistage fitness test. After the researcher obtains the data, the researcher performs data entry.

The data analysis technique in this research uses descriptive statistical data analysis techniques with percentages. Descriptive statistics is research that describes the actual condition of a population or sample by analyzing data using existing regulatory formulas, in accordance with the research approach or design taken. (Arikunto, 2013) . The formula for finding the percentage of fitness level for the SMA Negeri 22 Makassar futsal team is:

$$\boldsymbol{P = \frac{f}{N} \times 100\%} \quad (3.1)$$

Information :

P = Percentage sought

f = Frequency or number of subjects

N = Total number of subjects

After getting the existing scores, then a category or group is created according to the existing levels. Categorization uses five norm limits as a reference, namely as follows:

Table 1. Categories of *Bleep Test* Standardization Norms

No	Score Intervals	Category
1	> 51.6	Very good
2	42.6 - 51.5	Good
3	33.8 - 42.5	Enough
4	25.0 - 33.7	Not enough
5	< 25	Very less

Source: Ngatman & Andriyani (2017: 183) in (Chandryani et al., 2021)

C. Results and Discussion

The data obtained in the field was in the form of test results and measurements of the level of cardiorespiratory endurance of the SMA Negeri 22 Makassar futsal team. Data tabulation was first carried out to facilitate further testing. Descriptive data analysis is intended to get a general overview of the data including total values, averages, standard deviations, minimum data, ranges, frequency tables and graphs.

1. Descriptive Analysis

Descriptive data analysis is intended to get a general picture of the research data. Analysis of the level of cardiorespiratory endurance of the SMA Negeri 22 Makassar futsal team. It is hoped that these statistical values can provide a general idea of the level of cardiorespiratory endurance of the SMA Negeri 22 Makassar futsal team. The results of the research analysis can be seen in table 2 .

Table 2. Descriptive Analysis Results

Score Intervals	Category	Frequency	Percent
> 51.6	Very good	0	0%
42.6 – 51.5	Good	0	0%
33.8 – 42.5	Enough	10	62.50%
25.0 – 33.7	Not enough	6	37.50%
< 25	Very less	0	0%
Amount		16	100%
Average			34.6
Maximum Score			39.2
Minimum Score			30.6
Range			8.60
Stds. Deviation			2.58

Based on the table above, the results of the cardiorespiratory endurance test for the SMA Negeri 22 Makassar futsal team from the 16 respondents who were futsal team players were included in the Very Good category, there were 0 people (0%), the good category there were 0 people (0%), the fair category there were 10 people (62.5%), in the less or less category there are 6 people (37.5%) and in the Very Less category there are 0 people (0%). As for a number of possible factors influence results test age, training, pattern eating, condition health, genetics, motivation and factor psychological.

Descriptive analysis with the percentage of research results according to the level of bleep test results using the percentage formula:

$$P = \frac{f}{N} \times 100\% \quad (4.1)$$

Level 5 Percentage= $\frac{5}{16} \times 100\% = 31,25\%$

Percentage (Level 6)= $\frac{6}{16} \times 100\% = 43,75\%$

Percentage (Level 7)= $\frac{4}{16} \times 100\% = 25,00\%$

Descriptive analysis with percentage of bleep test research test results using the percentage formula:

$$P = \frac{f}{N} \times 100\% \quad (4.2)$$

Percentage (Very Good)= $\frac{0}{16} \times 100\% = 0\%$

Percentage (Good)= $\frac{0}{16} \times 100\% = 0\%$

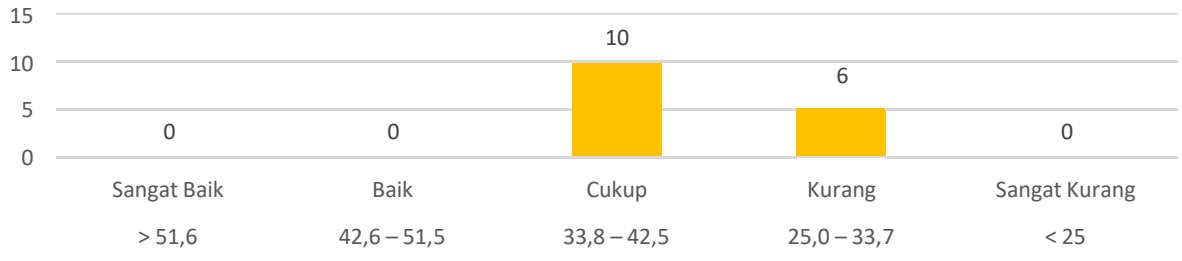
Percentage (Enough)= $\frac{10}{16} \times 100\% = 62,5\%$

Percentage (Not Good)= $\frac{6}{16} \times 100\% = 37,5\%$

Percentage (Very Less)= $\frac{0}{16} \times 100\% = 0\%$

To understand the percentages for each category, they are presented in graphic form below:

Figure 3. Percentage of Futsal Team Cardiorespiratory Endurance Level
Make it one column



Discussion

In the sufficient category there were 10 people or 62.50%, where 10 people out of 16 got a score of 33.8 – 42.5 in the category assessment list who got this score, including in the sufficient category. This is because the training process to increase cardiorespiratory endurance is rarely carried out during the training process, resulting in the process of increasing endurance not being carried out well and increasing the cardiorespiratory endurance of futsal players.

In the unfavorable category, there were 6 people or 37.50% in the unfavorable category assessment list. This is due to the fact that it is rarely done and the players also rarely participate in the training process, which makes their cardiorespiratory endurance condition less good. Most of them prioritize technique and put aside their endurance.

Endurance is one of the most important elements of physical condition, because it is the basis of other elements of physical

condition. Cardiorespiratory endurance is a person's ability to carry out physicalactivity continuously for a relatively longtime with sub-maximal loads (Sakir, 2019).Endurance in the world of sports is known as the ability of an athlete's bodyorgans to resist fatigue during activities or work. Endurance or endurance is alwaysclosely related to the length of work(duration) and work intensity, the longer theduration of training and the higher the work intensity that an athlete can do, it means he has good endurance or endurance.

Endurance greatly influences the players in the game of futsal itself, because one of the physical components that has a big influence in the game of futsal is endurance. (Sambora, 2021). When futsal players have good endurance, they will be able to play futsal with intensity for a long time without feeling excessive fatigue, especially when playing futsal requires players to keep moving so they can attack and defend simultaneously.

The specific physical conditions look at the characteristics of the sport of futsal, where the game is so fast and dynamic. This sport also requires special tactics and techniques. Likewise, in terms of physical condition, futsal is different from other sports. The characteristic of futsal is that it requires speed endurance, strength endurance and agility over a relatively long period of time.

Based on the results of the cardiorespiratory endurance test of the futsal team of SMA Negeri 22 Makassar, it can be explained that from 16 respondents futsal players under 18 years of age were included in the Very Good category, there were 0 people (0%), the good category there were 0 people (0%), the category There were 10 people (62.5%) in the sufficient category, 6 people in the insufficient category (37.5%) and 0 people in the Very Poor category (0%). This endurance training is a basic training that every individual who is involved in theworld of sports must have. Endurance will be the initial capital, namely a physicalfoundation for carrying out subsequent training. Endurance in the world of sports isknown as the ability of the body's organs to resist fatigue during activity or work(Nurfadhila, 2016) .

Multistage Fitness Test) test instrument showed sufficient results due to dominance with sufficient results of more than 50%. Lack of physical exercise can affect the results of endurance tests, because this physical exercise is rarely done by players. Diet can also influence this, eating patterns that are not controlled by the trainer can reduce the level of cardiorespiratory endurance of each individual. This endurance is very important for the future,

the better the endurance, the better the quality of the player.

This also shows that some futsal players at SMA Negeri 22 Makassar, especially those used as samples in this study, need to improve their endurance abilities. If the endurance of SMA Negeri 22 Makassar futsal players is in excellent condition then these players can last longer and can improve the quality of their performance in futsal games. For this reason, the training program for physical condition must be systematically improved so that it becomes even better and physical condition is maintained well.

D. Conclusion

Based on the results of the cardiorespiratory endurance test of the SMA Negeri 22 Makassar futsal team, which involved 16 player respondents under the age of 18, it can be concluded that the level of cardiorespiratory endurance possessed by the futsal players of SMA Negeri 22 Makassar is categorized as sufficient. This test provides an overview of the body's ability to produce energy efficiently during physical activities that involve the cardiovascular system.

In the cardiorespiratory endurance test, SMA Negeri 22 Makassar futsal players are tested in physical activities that involve intense and repetitive movements, such as long-distance running or sprinting. The test results showed that the players were able to maintain their level of cardiorespiratory endurance over a fairly long period of time, indicating adequate cardiorespiratory fitness.

A sufficient level of cardiorespiratory endurance is important in the sport of futsal, which involves fast movements, sudden changes in direction, and high intensity. By having a sufficient level of cardiorespiratory endurance, SMA Negeri 22 Makassar futsal players can maintain their performance during matches, reduce fatigue and minimize the risk of injury.

However, please remember that the results of this test only reflect the conditions at the time of testing and do not include other factors that can influence cardiorespiratory endurance, such as diet, physical exercise, and genetic factors. Therefore, it is important for SMA Negeri 22 Makassar futsal players to continue to improve and maintain their cardiorespiratory endurance levels through regular training and a healthy lifestyle.

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F. Conflict of Interest

There is no conflict of interest

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