Profile of Aerobic Endurance Level (VO_2Max) for Each Position of Soccer Academy Athletes Age 17 at Cilegon City

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Abstract: In the sport of soccer, the most dominant component of physical condition is aerobic endurance ability. The aim of this research was to determine the level of aerobic endurance in the positions of the back, middle and front players. The method in this research uses ex post facto, with a quantitative type of research. The research design uses a quantitative descriptive approach. The subjects in the research were IGOR, PERSIC, and MSFA Football Schools (SSB) with a total of 30 players. The technique used in sampling is purposive sampling. The overall research results obtained are in the sufficient category. The conclusion of this research is that in the three positions analyzed by the researcher there are no significant differences in the three positions. So researchers can provide suggestions that school football teams can increase the players' endurance through various methods and types of training that can help increase the players' endurance.

Keywords: Endurance level; VO2Max, Soccer Academy

INTRODUCTION

Sport is a body movement activity that is often carried out in everyday life, for now and in the future sport plays an important role in social life and is used as a lifestyle that can have a positive impact from various sports activities that are growing rapidly, because in people's lives never separated from the movement process. The facts on the ground are that all levels of society play sports without considering race, ethnicity, religion, educational background, social status or gender.

Sport is able to build national character, sport is a strategy in building self-confidence, national identity and national pride by obtaining sporting achievements (Syahputra & IP, 2019) in (Aditia et al., 2022) . Achievement sports are sports that participate in sports championships from regional, national and international championships

Football is a very popular sport in the world and this sport is very easy to understand. This sport has no age limits, so it can quickly develop in Indonesia. Football has its own charm which lies in the naturalness of the game. According to

(Azidman, 2017) in (Alamsyah et al., 2022) football is a challenging game both physically and mentally, with limited playing time we must have skilled movements.

In order to foster good performance, coaching must be carried out starting from an early age and for talented athletes, which is very important in achieving optimal quality performance in the sport of football and being able to compete with other countries. The seeds of superior athletes need scientific management and training processes, so that only then will maximum athlete performance emerge at a certain age. Young talented athletes can be identified in schools, clubs, SSBs and organizations in their field. In determining the dexterity of a soccer game, physical, tactical and mental coordination skills are very much needed in the athlete formation process.

Then according to (Lutan, 2000:11) in (Putri & Suripto, 2020) coaching is an effort to organize or a way to achieve a goal, coaching is an action taken to change a situation well to get the goal achieved optimally.

Football players are described as playing intermittently using a good level of physical condition. In football, there are demands placed on football athletes in terms of fitness readiness requirements to produce strength (Power), explosiveness (Explosiveness), speed (Speed), agility (Agility), balance (Balance), body stability (Body stability) , flexibility (Flexibility), and an adequate level of endurance (Endurance) (Dragijsky et al., 2017) . This may create a need to improve the performance of soccer athletes and specifically determine the physiological profile of soccer athletes.

In the game of football, there are various player positions, usually divided into 3 groups of player positions, namely: 1). The positions of the defenders include: Center Back, Left Back, Right Back, 2). Central playing positions include: Defending Midfielder, Center Midfielder, Attacking Midfielder, 3). The positions of the forward players include: Shadow Striker, Wing Forward, Center Forward.

In the sport of soccer, the most dominant component of physical condition is aerobic endurance ability. According to (Nugraha, 2017) in (Candra & Setiabudi, 2021) endurance is an important component of physical condition and can be said to be the foundation for developing other physical conditions. Cardiovascular (Aerobic) endurance is the ability of the body's organisms, especially the heart, lungs and circulatory system, to overcome fatigue caused by exercise that is relatively long in duration.

One way to improve human health and physical fitness, especially aerobic exercise, is by exercising regularly. According to (Irawan, Putra, & Chuang, 2019) in (Hadi et al., 2021) aerobic exercise is sports activity with low to moderate intensity that is carried out continuously, such as: gymnastics, running and cycling.

According to (Anam et al., 2019) increasing aerobic endurance in soccer players improves soccer performance by increasing distance traveled, work

intensity, and the number of sprints and involvement with the ball during the match. According to (rikimakaro.blogspot.com) in (Indrayana & Yuliawan, 2019) several studies show that increasing VO 2 max can be done by training at a heart rate intensity of 65% to 85% of maximum heart rate, for at least 20 minutes, with a training frequency of 3 -5 times a week.

According to (putra et al., 2015) in (Triyanto et al., 2021) coaches can use many training methods that can be applied to help soccer players improve the quality of their VO2Max such as Interval Training , Fartlek Training , Continuous Training, and practice small game.

Regular cardiovascular endurance training can increase Maximum Oxygen Volume (VO2Max). VO2Max itself has the meaning where V (Volume), O2 (Oxygen), and Max (Maximum). According to (Smirmaul et al., 2013) in (Festiawan et al., 2021) VO2Max is the maximum capacity of the lung, heart and muscle system to absorb oxygen. According to (Feriyanto, 2010) in (Candra & Setiabudi, 2021) , VO2Max can also be called maximum oxygen consumption or aerobic capacity. Meanwhile, according to (Nusri & Panjaitan, 2019) aerobic endurance is the ability to carry out long-term activities related to O2 and ATP to supply energy.

To find out the VO2Max value, measurements are needed which are called tests. Testing can be done in the laboratory or in the field. Laboratory testing is expensive because it requires sophisticated equipment and trained testers. Laboratory testing is not effective for large groups. Therefore, it is necessary to develop a simple field test to provide accurate VO2Max values. According to (Fitriani Dewi et al, 2017) in (Swandri et al., 2018) the field tests carried out were the balke test, cooper test and multistage fitness test. In this study, the Balke test was used, because the Balke test is the most suitable method for the characteristics of the game of football and can be used to measure fitness simultaneously in large quantities at the same time with accurate results.

Based on data available from PSSI, Cilegon City has 42 SSB registered as members of PSSI Cilegon City, 25 of which are SSBs that are still actively participating in the Cilegon City PSSI agenda. Based on data and information from the PSSI chairman, 3 productive SSBs are in Cilegon City and have quite a lot of students and take part in various competitions, one of the three SSBs is also able to contribute players to the Garuda selection. Therefore, researchers want to conduct research on the Aerobic Endurance Level Profile (VO2Max) for each position of the Cilegon City SSB KU-17 football players in the 3 SSBs including IGOR, PERSIC, MSFA because in terms of the player positions they have different levels of endurance. aerobics (VO2Max).

METHOD

In this research the method used was ex post facto. Ex post facto research is research that is usually used to examine or trace back the factors of the event being

studied where the incident has been experienced by the respondent (Sugiyono, 2015) in (Asyrifah Zaini Wahdah & Putri Nur Malasari, 2022) .

This research design uses a quantitative descriptive approach. According to (Sugiyono, 2017) the quantitative approach method is research that is guided by the philosophy of positivism to conduct research on certain samples or populations, sampling using random techniques, using research instruments to collect data, and quantitative data analysis to test hypotheses.

The population of this study was SSB IGOR, PERSIC and MSFA Ku-17 Cilegon City totaling 52 players, the sample used was 30 players. The sampling technique uses purposive sampling . Purposive sampling is a sampling technique that is based on certain criteria taking into account the nature of the population and also the sample (otoatmodjo, 2010) in (Lenaini, 2021)

In this study, the instrument used was a test and measurement of the level of aerobic endurance (VO2Max) for each position of SSB players in Cilegon City KU-17, namely the balke test. The balke test is a 15 minute running test on a 400M running track area. Balke test results are calculated using the formula:
VO2Max (mls/kg/min) : – (((Running distance ÷ 15) - 133) × 0.172) + 33.3

Table 1 . Standardization Norms for Capability Vo $_2$ max

No	Score	Category
1	<35	Very bad
2	35-37	Bad
3	38-44	Enough
4	45-50	Good
5	51-55	Very well
6	>55	Very good

Source: (Candra & Setiabudi, 2021)

This research uses data collection techniques, namely observation and documentation, then the data analysis technique used by researchers is the *Independent Test* with the help of SPSS 20 *for Windows*

RESULTS

The data used to analyze the results of this research is data obtained from the results of aerobic endurance tests (VO2max) on 3 SSBs in Cilegon City, namely SSB IGOR, PERSIC, and SSB MSFA. The following is a description of the VO2Max data results for each player position:

1) Defender

The average value of the VO2Max endurance level for the SSB IGOR, PERSIC, MSFA KU-17 defender position is 44.19 with a standard deviation of 3.47 and the lowest score is 40.5, the highest score is 51.1 and the total score is 530.

2) Midfielder

The average value of the VO2Max endurance level for the position of SSB IGOR, PERSIC, MSFA KU-17 midfielder is 44.83 with a standard deviation of 4.21 and the lowest score is 40.2, the highest score is 53.7 and the total score is 403.

3) Front player

The average value of VO2Max endurance level for the position of SSB IGOR, PERSIC, MSFA KU-17 forward players is 44.42 with a standard deviation of 2.11 and the lowest score is 41.1, the highest score is 48.4 and the total score is 399.

4) Overall player position

The average value of the VO2Max endurance level for each position of the SSB IGOR, PERSIC, MSFA KU-17 players is 44.45 with a standard deviation of 3.28 and the lowest score is 40.2, the highest score is 53.7 and the total score is 1333.

From the results of the balke test carried out by each SSB, the percentage of research subjects can be seen and the scores can be seen from the table below.

1) Defender

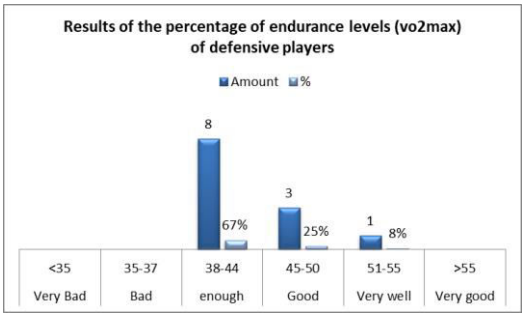

Figure 1 Chart of the percentage results of the endurance level (VO_2Max) of defenders.
Source: 2024 research results

Based on Figure 1 on the position of the defender, the results obtained from data on the endurance level of VO2 Max SSB IGOR, PERSIC, MSFA KU-17, it is known that VO2Max is in the fair category as many as 8 players (67%), in the good category there are 3 players (25%), in the very good category 1 player (8%), and there are no players in the very bad, bad and very good categories.

2) Midfielder

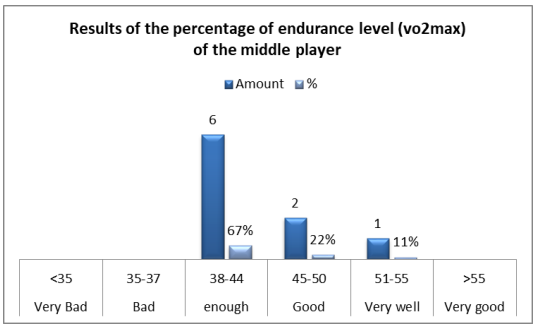

Figure 2 Chart of endurance level percentage results (VO_2Max) for middle players.
Source: 2024 research results

Based on Figure 2 in the middle player position, the results obtained from data on the endurance level of VO2 Max SSB IGOR, PERSIC, MSFA KU-17, it is

known that VO2 Max is in the fair category as many as 6 players (67%), in the good category there are 2 players (22%), in the very good category 1 player (11%), and there are no players in the very bad, bad and very good categories.

3) Front player

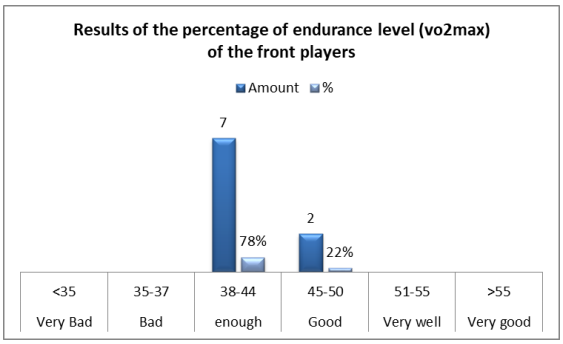

Figure 3 Chart of endurance level percentage results (VO_2Max) for forward players.
Source: 2024 research results

Based on Figure 3 in the position of the front players, the results obtained from data on the endurance level of VO2 Max SSB IGOR, PERSIC, MSFA KU-17, it is known that VO2Max is in the fair category as many as 7 players (78%), in the good category there are 2 players (22%), and there are no players in the very bad, bad, very good and very good categories.

4) Overall player position

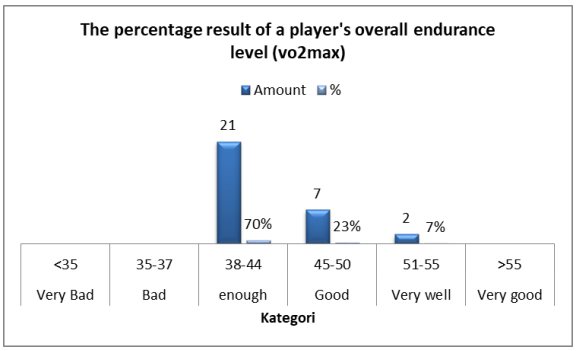

Figure 4 Chart of the percentage results of a player's overall endurance level (VO_2Max).
Source: 2024 research results

Based on Figure 4 on the overall position of the players, the results obtained from data on the endurance level of VO2Max SSB IGOR, PERSIC, MSFA KU-17, it is known that VO2Max is in the fair category as many as 21 players (70%), in the good category there are 7 players (23%), in the very good category 2 players (7%), and there are no players in the very bad, bad and very good categories .

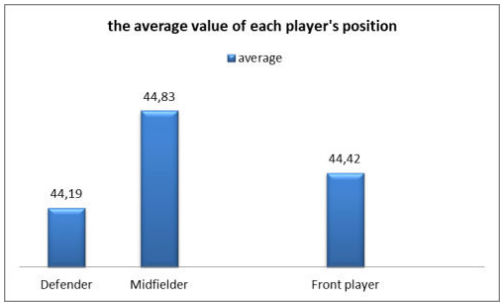

Figure 5 Chart of the average VO_2Max value for each player position.
Source: 2024 research results

Based on Figure 5, the average value of VO2Max for each SSB IGOR, PERSIC, MSFA KU-17 player position is obtained, in the middle player position the average value is 44.83, in the back player position the average value is 44.19. , the front player position obtained an average value of 44.42.

To see and find out the differences in the level of endurance for each position of SSB IGOR, PERSIC, MSFA KU-17 players in Cilegon City. Researchers conducted an independent T test. The following is a description of the results of the VO2Max difference data for each player position.

1) The position of the defender with the position of the midfielder

In the independent T-test, the position of the defender and the position of the middle player obtained a sig (2-tailed) value of 0.715, so the sig (2-tailed) value was >0.05. So there is no significant difference between the results of the VO2Max endurance level in the defender position and the middle player position in SSB IGOR, PERSIC, MSFA KU-17.

2) the position of the back player with the position of the front player

in the independent T-test, the position of the back player and the position of the front player obtained a sig (2-tailed) value of 0.853, so the sig (2-tailed) value was >0.05. So there is no significant difference between the results of the VO2Max endurance level in the defender position and the SSB IGOR forward position, PERSIC, MSFA KU-17 .

3) The position of the middle player with the position of the front player

DISCUSSION

In processing descriptive analysis data from research subjects, the VO2Max endurance level for each position of the SSB IGOR, PERSIC, MSFA KU-17 players obtained that the results for each player position were in the "Enough" category because the average player was not optimal when carrying out tests and in training. Even the players have not participated in maximum physical training according to the coach's instructions.

In this study, the results obtained for the defender positions were mostly VO2Max 38-44 in the fair category, 8 people (67%), VO2Max 45-50 in the good category, 3 people (25%). VO2Max 51-55 in the very good category is 1 person (8%). In the back player position there are 8 players belonging to the sufficient category.

In the middle player position, the VO2Max results obtained were mostly in the sufficient category. VO2Max 38-44 in the fair category was 6 people (67%), VO2Max 45-50 in the good category was 2 people (22%), VO2Max 51-55 was in the very good category was 1 person (11%).

In the front player position, the VO2Max results obtained were mostly in the sufficient category. VO2Max 38-44 in the fair category was 7 people (78%), VO2Max 45-50 in the good category was 2 people (22%).

Judging from the overall results of the VO2Max endurance level for each position of the SSB IGOR, PERSIC, MSFA KU-17 players in Cilegon City. Most of the VO2Max 38-44 is in the fair category as many as 21 people (70%), VO2Max 45-50 in the good category is 7 people (23%), VO2Max 51-55 is in the very good category as many as 2 people (7%), and not there are players who fall into the very bad, bad, and very good categories. With the results of the average VO2Max endurance level for each SSB IGOR, PERSIC, MSFA KU-17 player position in Cilegon City, the back player position is 44.19, the middle player position is 44.83, and the front player position is 44.42.

In the middle player position the players should have a high VO2Max because the middle player position acts as an attack motor and has high mobility so a higher VO2Max is needed than other player positions (Modric et al., 2020), then the defender position generally has a VO2Max in the very good category because it is responsible for blocking the ball and often has aerial duels and sometimes also participates in attacks (Modric et al., 2020) , in the front player position the players should have a VO2Max in the good category because front players have less running distance than other positions (Modric et al., 2020) .

The results of research carried out using the independent T test show that there is no significant difference between the positions of the defender and the midfielder, the defender and the forward, and the midfielder and the forward, there is no significant difference in the level of VO2Max endurance for each position of the SSB IGOR, PERSIC, MSFA players. KU-17 in Cilegon City. Physical condition is very important for football, football is a dynamic sport that really requires endurance to compete well (Nugraha, 2013) in (Anggara & Subagio, 2021).

Every player is required to have good fitness so that they do not easily experience fatigue during the match. When a player experiences fatigue, many changes occur in the player, such as reduced focus and emotional instability. Therefore, a player must have a large amount of energy to meet these endurance demands. VO2 Max can affect a player's endurance, this can be obtained from training methods with high volume and lower intensity (Anggara & Subagio, 2021)

CONCLUSION

In general, researchers conclude that a player's VO2Max is very important, because it is one of the important factors in playing soccer. Therefore, the researchers more specifically concluded that the VO2Max endurance level of the back, middle and front players of SSB IGOR, PERSIC, MSFA KU-17 in Cilegon City was in the sufficient category.

It can be concluded that there are no significant differences in the three positions analyzed by the researchers. Judging from the results, many players have achieved good results. The players should get even better results. It is very important for a soccer player to have a high level of VO2Max endurance to support his performance during matches and training.

Conflict of Interest

The author(s) declare that they have no conflict of interest.

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