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Identify VO2 max levels in Malang United F.C Players Indonesian League 3 East Java Regional

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Abstract

Objective. The primary goal of this research is to evaluate and quantify the maximum oxygen uptake capacity (VO2 max) of the players from the renowned football club, Malang United FC. The players selected for this study are the ones who actively participate in the highly competitive East Java Regional Indonesian League 3. By analyzing their VO2 max endurance levels, we aim to gain a comprehensive understanding of their cardiovascular fitness and overall physical performance, which can potentially help the coaches and trainers to optimize their training regimes and improve the team's overall performance in the league.

Material and Method. The research employed the Qualitative Descriptive method, with the research subjects consisting of 23 players from Malang United F.C. who are currently participating in the East Java Regional Indonesian League 3. The study utilized a multi-stage fitness test, also known as the bleep test, to measure the VO2 max of the research subjects. The data obtained from this study were analyzed using descriptive quantitative percentages.

Result. According to the findings of the study, the average VO2 max level among the participants was determined to be within the range of good (40.80-55.70 ml/kg/minute). The analysis further revealed that out of the total 23 subjects, 1 individual was categorized as having a poor VO2 max level, 3 individuals had an adequate level, 12 individuals had a good level, and 7 individuals had a very good VO2 max level.

Conclusion. Based on the research findings, it can be inferred that the football players of Malang United F.C. have a commendable average VO2 max level. VO2 max is a crucial factor in the game of football, and a good VO2 max can contribute significantly to achieving optimal results as a football player.

Keywords: **VO2 max, Football, Sports**

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Introduction

Sports are a set of physical activities performed by humans that result in holistic improvements in individual health, including physical, mental, and emotional aspects (Ekrima, 2021). Engaging in sports activities can serve as an effective way of preserving and enhancing one's physical well-being (Kesehatan, 2007). Participating in sports can be a great way to attain one's desired achievements. However, to excel in a particular sport, an individual must possess a physically fit body capable of supporting such accomplishments. Without a fit body, it may be difficult to achieve the desired level of success in a particular sport (Jasmani, 2017). Achievement sports are sports that are organized in a planned, tiered, and sustainable manner through a series of competitions to achieve achievements through the support of sports science and technology (Pulungan & Dimyati, 2019)

Football is a popular sport worldwide, with many achieving great success, including in Indonesia (Zakiyuddin, 2017). Almost all football competitions, both at the club and state level, are a special attraction for the public (Widodo, 2018). In playing football, good physical, technical, and mental abilities are needed to support maximum performance (RI, 2015). This is because in soccer a person has to run in approximately 2x45 minutes, move in all directions quickly, move their hands, feet and head correctly, and jump correctly (Nosa, 2013). Football athletes must also have the ability to dribbling, passing, kicking and heading (Widodo, 2018). Football players need a fit body to support the physical demands of the sport and perform well in their trainer's program.

Maintaining physical fitness is crucial for performing daily activities efficiently. Athletes and sportsmen must focus on their physical fitness to support their training and achieve optimal performance. Fitness is made up of several components, including agility, speed, cardiovascular endurance, flexibility, and body composition (Sudarsono, 2005). These components support athletes' achievements. In the sport of football, almost all components of physical fitness are needed as a basis for carrying out a match or competition.

Cardiovascular endurance is a physiological measure of an individual's capacity to inhale, circulate, and utilize oxygen during physical exertion. This measure is indicative of the efficiency with which an individual's cardiovascular system delivers oxygen-rich blood to the working muscles, allowing them to sustain activity over a prolonged period. It is an essential aspect of physical fitness and is often used as a key performance indicator in various sports and athletic activities. The ability to improve cardiovascular endurance through regular exercise and training is widely recognized as a fundamental component of a healthy lifestyle (Nyirih et al., 2016). Cardiovascular endurance or what is more often called VO2 max is an important component of physical fitness in football (Broich et al., 2012). Football requires a lot of energy to be able to last more than 2x45 minutes without experiencing fatigue. Apart from that, in the sport of football, someone with a high VO2 max will be more profitable because they can withstand long periods of time on the field compared to someone with a low VO2 max (Ilissaputra & Suharjana, 2016). A high VO2 max can greatly benefit players by improving their endurance and allowing them to maintain their performance levels for longer periods of time during a match. Additionally, a high VO2 max can also enhance a player's concentration, enabling them to focus better on their skills and strategy on the field and make the most of their abilities during the match.

Malang United is a professional football club that competes in the East Java Regional Indonesian League 3. Based at the Gajayan Stadium in Malang City, the club boasts a squad of 23 players who participate in the league. The team comprises 3 goalkeepers, 8 defenders, 9 midfielders, and 3 strikers, all of whom showcase their skills in the highly competitive East Java Regional Indonesian League 3.

Based on the initial findings, the researchers carried out a study to ascertain the VO2 max level of the Malang United F.C. players who are scheduled to participate in the East Java Regional Indonesian League 3. The aim of this inquiry is to provide coaches and staff with useful information that can help them harness the players' full potential during matches.

Materials and Methods

Study participant.

The research conducted was focused on the football players of Malang United FC, a team competing in the East Java Regional Indonesian League 3. The team consists of 23 players, including 3 goalkeepers, 8 defenders, 9 midfielders and 3 strikers.

Study organization.

As part of their research, the investigators utilized test and measurement instruments. A test, in this context, refers to an object or device that serves to elicit information and gather data. It is critical that the design of the test be specific and tailored to the research objectives. To achieve reliable and accurate results, researchers must employ rigorous and well-established testing procedures (Fenanlampir & Faruq, 2015). The specificity of the test is in terms of the type of test to be used, questions and answers that must be designed according to predetermined criteria (Ismaryanti, 2006).

Table 1. VO2 max Assessment Norms (Maks & Siswa, 2008)

Age	Very Poor	Poor	Fair	Good	Excellent	Superior
13-19	<35.0	35.0-38.3	38.4-45.1	45.2-50.9	51.0-55.9	>55.9
20-29	<33.0	33.0-36.4	36.5-42.4	42.5-46.4	46.5-52.4	>52.4
30-39	<31.5	31.5-35.4	35.5-40.9	41.0-44.9	45.0-49.4	>49.4
40-49	<30.2	30.2-33.5	33.6-38.9	39.0-43.7	43.8-48.0	>48.0
50-59	<26.1	26.1-30.9	31.0-35.7	35.8-40.9	41.0-45.3	>45.3
60+	<20.5	20.5-26.0	26.1-32.2	32.3-36.4	36.5-44.2	>44.2

A test is a procedure that involves a set of questions or treatments designed for a specific purpose to obtain results. The Multi Stage Fitness Test or Bleep Test instrument is used to collect cardiovascular endurance data. The Bleep test, in particular, is aimed at measuring VO2 max endurance and predicting an individual's aerobic endurance (Suharjana, 2003). In this study, data was taken using predetermined procedures. Meanwhile, for research documentation, researchers used photos and a list of subjects present at the time the research took place.

Statistical analysis.

For this research study, the data analysis was carried out manually with the assistance of a PRECICALC type PR-350MSC calculator. The analysis method employed here is descriptive quantitative percentage, which is used to process data in a descriptive form, specifically in terms of percentage.

Results

The data used in this study pertains to the VO2 max level measurement results for the players of Malang United F.C. Specifically, the Multi-Stage Fitness Test, also known as the Bleep Test, was employed to conduct the analysis. The resulting data has been presented in Table 2.

Table 2. Player VO2 max Measurement Results

Categories	Number
Poor	1
Fair	3
Good	12
Excellent	7
Superior	0

The data obtained from the conducted tests revealed that out of the 23 participants, one individual had a VO2 max level that was below average. Three individuals were categorized as having a fair VO2 max level, whereas 12 participants were found to have a good VO2 max level. Seven of the participants showcased an exceptional level of VO2 max, which is an indicator of a high level of fitness and endurance.

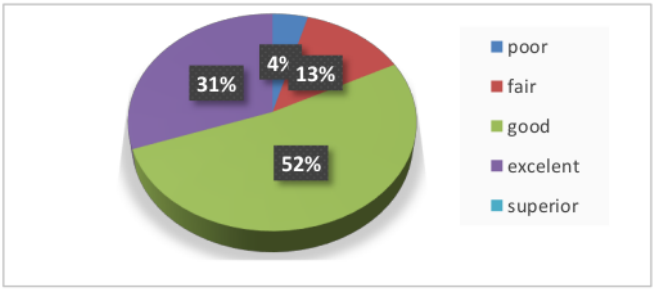

Figure 1. Percentage of VO2 max level of Malang United F.C players

Discussion

The present study aims to investigate the VO2 max levels of the football players in Malang United F.C. The results revealed that out of 23 players, only one player (4%) had low VO2 max endurance, three players (13%) had adequate VO2 max, 12 players (52%) had good VO2 max, and seven players (31%) had very good VO2 max. The obtained data suggests that, on average, the Malang United F.C. players possess a good level of VO2 max, indicating their fitness and readiness to participate in the East Java Regional Indonesian League 3 competition. However, it is recommended that players with sufficient or low VO2 max levels should work on improving their cardiovascular endurance to support their performance during the competition.

A person's cardiovascular endurance can be influenced by their lifestyle, diet, and daily physical activity. Aerobic endurance training is dependent on the body's ability to utilize oxygen in order to burn energy sources (Palar et al., 2015). Engaging in aerobic endurance training can greatly benefit the heart. During exercise, the heart increases in size, allowing it to carry a greater volume of blood and leading to a stronger pulse. This occurs because the active muscles require more oxygen, leading to an increase in nutrient usage and acceleration of the body's metabolic processes. As a result, metabolic waste is produced (Palar et al., 2015). Therefore, regularly doing aerobic activities can increase a person's aerobic endurance (VO2 max).

Based on Wibowo's research at the Satya Wacana Salatiga Basketball club which will take part in the 2017 Indonesian Basketball League, the results of measuring physical fitness using the Multi Stage Fitness Test on 14 athletes showed that 8 athletes were in the good category. 4 athletes in the sufficient category and 2 athletes in the low category. From this research, it was concluded that the average Satya Wacana basketball player had good aerobic endurance (Wibowo, 2016).

Meanwhile, in research conducted by Nosa at the PSIL Lumajang Football Club which competed in the East Java Regional National League 3 using the Multistage Fitness Test, it was found that the results of research on 22 PSIL players were good with an average VO2 max of 49.02 ml/kg/minute (Nosa, 2013).

Maintaining good aerobic endurance (VO2 max) is crucial for athletes in most sports, as evidenced by previous research. The study results have consistently shown positive outcomes, which is also consistent with the research conducted on Malang United F.C. players. Therefore, it is essential for players to maintain and improve their VO2 max levels to ensure optimal performance during competitions.

Conclusions

The following report presents the results of a study conducted on the VO2 max levels of football players belonging to Malang United F.C. The study was conducted on a sample of 23 players who competed in the East Java Regional Indonesian League 3. The results reveal that out of the total sample, one player displayed low VO2 max levels, three players exhibited sufficient VO2 max levels, 12 players demonstrated good VO2 max levels, while the remaining seven players showcased very good VO2 max levels. Based on these findings, it can be inferred that Malang United F.C. has an overall good average VO2 max level, which can enable them to compete in the East Java Regional Indonesian League 3. Nonetheless, players who exhibit lower fitness levels must strive to enhance their fitness in order to support their performance during competitions.

Acknowledgment

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Conflict of interest

The researcher in question hereby declares that there exists no conflict of interest with regards to the subject matter at hand.

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