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VO2MAX PROFILE OF PRE-PORPROV FUTSAL ATHLETES FROM KENDAL REGENCY IN 2025

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Abstract
This study aims to obtain concrete data on the VO2Max capacity of pre-PORPROV futsal athletes from Kendal Regency in 2025. The research employed a descriptive design with a quantitative approach to objectively illustrate the current condition. Data collection for this study is survey method, utilizing standardized tests and measurements in the form of the Multistage Fitness Test (bleep test). The sample of the study consisted of 20 pre-PORPROV athletes from Kendal Regency in 2025. Data analysis was conducted using descriptive quantitative methods with percentage analysis, allowing numerical data to be presented in a concise and systematic manner. The findings disclose that the athletes' VO2Max endurance levels are vary. Based on the results of the Multistage Fitness Test (Bleep Test), the average VO2Max score is 44.5 ml/kg/min. This value indicates that, in general, the aerobic capacity of the pre-PORPROV futsal athletes from Kendal Regency in 2025 falls within the "fair" category.
Keywords: *VO2Max, Daya Tahan, Futsal*

INTRODUCTION

Futsal is a simpler sport compared to football, played on a smaller field with fewer players on each team (Putra Dwi P, 2020). Futsal is one of the sports that is popular among various groups, ranging from children and teenagers to adults. Eventually, futsal has become not only a sport enjoyed and played by men, but also one that is increasingly favored and played by women. Juan Carlos Ceriani, an Argentine citizen living in Uruguay, is recognized as the inventor of futsal. He was born in Buenos Aires, Argentina, on March 9, 1907 (Budiman et al., 2023). Futsal was introduced in Indonesia around 1998–1999, but it began to gain and develop broad popularitysignificantly in 2002 when the AFC (Asian Football Confederation) appointed Indonesia as the host of the final round of the AFC Futsal Championship. This championship was held from October 22 to 30, 2002, at Istora Senayan, Gelora Bung Karno, Jakarta. Following that event, futsal began to attract public interest, and various futsal tournaments started to be organized across Indonesia.

Futsal is a fast-paced sport that involves rapid transitions between attacking and defensing, with players constantly moving and changing positions throughout

two 20-minute halves. Futsal is played on a smaller court than traditional football, which results in a high-intensity game that demands both technical skills and prime physical condition. Physical capability is one of the key components that futsal athletes must acquire. Therefore, futsal players are required to possess a high level of physical fitness, including strength, speed, endurance, muscular explosive power, agility, balance, flexibility, and coordination. These components of physical fitness must be properly developed in order to support athletic performance (Nugroho & Yuliandra, 2021).

Cardiovascular-respiratory endurance is the ability of the heart, blood vessels, and respiratory system to sustain bodily performance over an extended period without experiencing excessive fatigue after completing the activity. Optimal cardiovascular endurance enhances the body's capacity to perform at higher intensity levels and for longer durations (Fastabiqi et al., 2024).

Aerobic capacity (VO2Max) refers to the maximum capacity of the body to perform aerobic activities. VO2Max indicates how effectively the body can uptake oxygen, distribute it to the muscles and other cells, and utilize it to produce energy, while simultaneously eliminating metabolic by-products that could impair physical performance. The level of endurance (VO2Max) should be considered by players in their efforts to enhance their futsal skills.

Physical capacity (VO2Max) is an important factor that supports the ability to play futsal during training sessions. The improvement of technical quality, both individually and as a team in futsal, does not rely solely on technical skills, but also requires enhancement of all necessary components—particularly VO2Max physical capacity. The level of physical capacity (VO2Max) can affect individual differences in futsal players' ability to perform various types of training as well as during matches. To improve lung vital capacity, physical training is necessary, as an individual's VO2Max level significantly affects their physical condition (Ismi et al., 2022). Futsal players with an optimal level of VO2Max physical capacity are capable of completing training sessions and matches without experiencing excessive fatigue. They are even able to carry out other activities afterward.

Based on observations conducted by the researcher on July 4, 2025, the 2025 Kendal Regency Pre-Porprov Futsal Team held an internal match session. During this internal trial match, some athletes from the team experienced fatigue before the match was completed, which affected their performance and resulted in suboptimal outcomes. Therefore, the researcher believes that physical aspects play a crucial role in futsal. Accordingly, this study was conducted to assess the VO2Max condition of the athletes on the Kendal Regency Pre-Porprov Futsal Team.

The 2025 Kendal Regency Pre-Porprov Futsal Team is a futsal team under the supervision of the Kendal Regency Football Association (Askab PSSI Kendal), prepared to participate in the Central Java Pre-Provincial Sports Week Championship (Pra Porprov Jateng). Pra Porprov serves as a preliminary selection stage prior to the Provincial Sports Week (Porprov). At this stage, athletes from various regions are selected to ensure that only individuals with the highest capabilities represent their respective areas. This activity plays a strategic role as an initial benchmark for athlete performance, as well as a means for planning and formulating optimal strategies in preparation for the main competition, namely the Provincial Sports Week (Porprov), which may subsequently lead to the national level. Pra Porprov itself is a multi-event championship held at the residency (regional) level in Indonesia and serves as a tiered pathway toward the provincial-level championship (Porprov) and eventually the national-level championship, the Pekan Olahraga Nasional (PON).

The cardiorespiratory endurance capacity of a futsal athlete plays a vital role and serves as a key factor in supporting performance and achieving optimal results throughout the game. Therefore, concrete data on the physical condition of the athletes is necessary as a basis for coaches' evaluation. This study aims to obtain concrete data regarding the VO2Max condition of the 2025 Kendal Regency Pre-Porprov Futsal Team athletes.

METHOD

The design of this study is a descriptive research type that employs a quantitative approach and aims to provide an objective overview of the current condition. Descriptive research is a research method intended to understand the

value of the dependent variable without analyzing its relationship or comparison with other variables (Sari et al., 2022).

This study was conducted on July 9, 2025, at SMK NU 06 Muallimin, located in Weleri, Kendal Regency, Central Java. The subject pool used in this study consisted of 25 athletes from the 2025 Kendal Regency Pre-Porprov Futsal Team. The sampling technique employed in this study was purposive sampling. Purposive sampling is a method of selecting samples based on criteria relevant to the research being conducted, thereby enabling the researcher to effectively explore the object or situation under investigation. Out of the 25 athletes, only 20 were selected based on the criteria of being present during data collection and not suffering from any injuries.

The data collection technique in this study employed a survey method, while still utilizing tests and measurements in the form of the multistage fitness test (bleep test). The data analysis technique applied in this research used a descriptive quantitative method with percentages, in which the data were processed numerically to present the findings in a more concise and systematic manner (Ma et al., 2023).

RESULT AND DISCUSSION

This study aims to determine the level of VO2Max physical endurance quality among Kendal futsal athletes participating in the 2025 Pre-Porprov. The method used is descriptive with a percentage-based approach. The basic characteristics of the sample include variables such as age, height, weight, and body mass index (BMI). The data are presented in table form, including statistical indicators such as sample size (n), maximum and minimum values, mean, standard deviation (SD), as well as median, mode, and range.

Table 1. Statistical Description of Research Result Data.

Variable	n	Min	Max	Mean	SD	Median	Modus	Range
Age (*yr*)	20	18	20	19,2	0,8	19	20	2
Height (*cm*)	20	160	175	166,8	3,9	166,5	170	15
Weight (*kg*)	20	52	70	59	4,6	58,5	60	18

BMI (*kg/m²*)	20	17,5	21,4	19,16	1,2	19,15	18,3	3,9
VO2Max (*kg/ml/mnt*)	20	36,2	58,0	44,5	6,0	44,9	45,9	21,8

Table 1 presents a descriptive statistical analysis of 20 athletes from the 2025 Kendal Regency Pre-Porprov Futsal Team. The athletes' ages range from 18 to 20 years, with an average age of 19.2 years. Height varies between 160–175 cm, with a mean of 166.8 cm, and body weight ranges from 52–70 kg, with an average of 59 kg. Body Mass Index (BMI) values range from 17.5 to 21.4 kg/m², with a mean of 19.16 kg/m². VO2Max results based on the Multistage Fitness Test (MFT) show a minimum value of 36.2 and a maximum of 58.0 ml/kg/min, with an average of 44.5 ml/kg/min. All data are presented along with the median, mode, standard deviation, and range values.

Table 2. Description of VO2Max Data for the 2025 Kendal Futsal Pre-Porprov

Variable	n	Mean ± SD	Min	Max
Age (yr)	20	19,2 ± 0,8	18	20
Level	20	8,9 ± 1,9	6	13
Shuttle	20	4,7 ± 2,9	1	9
VO2Max (*kg/ml/mnt*)	20	44,5 ± 6,0	36,2	58,0

Table 2 presents the VO2Max data of 20 athletes from the 2025 Kendal Regency Pre-Porprov Futsal Team. The athletes' average age is 19.2 years. The average running level is 8.9, with an average number of shuttles at 4.7. VO2Max scores range from 36.2 to 58.0 ml/kg/min, with a mean value of 44.5 ml/kg/min. All variables are accompanied by their respective standard deviations.

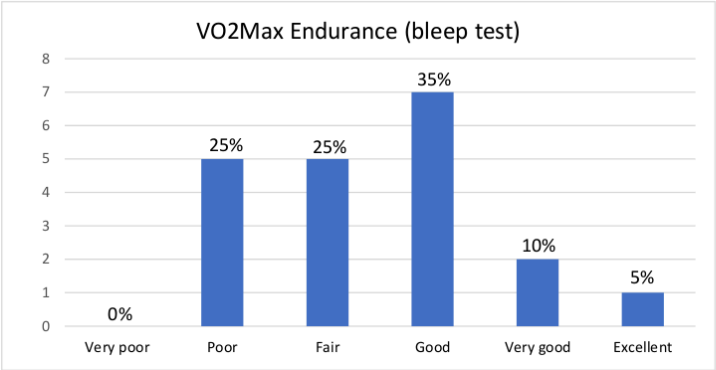

Figure 1. VO2Max Physical Endurance Bar Chart

Figure 1 presents the VO2Max data based on the results of the bleep test. The data show that none of the 2025 Kendal Regency Pre-Porprov Futsal athletes fall into the "very poor" category. A total of 5 athletes (25%) is classified as "poor," 5 athletes (25%) fall into the "fair" category, 7 athletes (35%) are categorized as "good," 2 athletes (10.00%) fall into the "very good" category, and 1 athlete (5%) is classified as "excellent.".

Discussion

Based on the results of the study conducted on athletes of the 2025 Kendal Regency Pre-Porprov Futsal Team using the Multistage Fitness Test (MFT) or bleep test to measure VO2Max physical endurance levels, it was found that there is variation in the endurance condition of each athlete. These differences are influenced by various internal and external factors. Internal factors include inherent aspects of an individual's body that are relatively stable, such as lung function, cardiovascular system performance, age, and biological sex (Setyagraha et al., 2024).

Meanwhile, external factors are related to elements outside the body that can influence physical condition, such as physical activity, quality of rest, and environmental temperature. To minimize the impact of these external factors, the athletes of the 2025 Kendal Regency Pre-Porprov Futsal Team need to make various efforts to improve their physical endurance by engaging in regular,

structured, and consistent training in order to maintain their fitness and physical stamina.

Several factors which influence cardiovascular endurance are genetic aspects, age, biological sex, aerobic capacity, as well as physical and psychological activity (Bachtiar et al., 2023). A person's VO2Max capacity is largely determined by hereditary factors, with some individuals naturally possessing higher VO2Max values than others. In general, VO2Max reaches its peak during the twenties and gradually declines with increasing age.

The research results indicate that the VO2Max physical endurance levels of the 2025 Kendal Pre-Porprov Futsal athletes are distributed as follows: 5 athletes (25%) fall into the "poor" category, 5 athletes (25%) in the "fair" category, 7 athletes (35%) in the "good" category, 2 athletes (10%) in the "very good" category, and 1 athlete (5%) in the "excellent" category. Based on descriptive statistical data, the average VO2Max value of the athletes was 44.5 ml/kg/min, which generally places them in the "fair" category in terms of VO2Max capacity.

The results of the study involving 20 athletes categorized by VO2Max condition indicate that athletes aged over 19 tend to have better VO2Max levels compared to those under 19 years old. This is likely because older athletes have had more extensive training experience. However, this also depends on training intensity and the athlete's genetic factors. In addition, there is a significant relationship between Body Mass Index (BMI) and VO2Max in terms of fitness and physical condition (Suwiwa et al., 2025). A high BMI—such as in cases of overweight or obesity—tends to negatively affect VO2Max due to the increased workload on the cardiovascular system and reduced oxygen use efficiency. Conversely, a normal BMI is generally associated with more optimal VO2Max capacity. Nevertheless, other factors such as physical activity and genetics also contribute to an individual's VO2Max level.

Aerobic endurance serves as the fundamental basis for the development of the anaerobic energy system, making it impossible to completely separate these two energy systems during training or physical activity. Therefore, this aspect becomes an important consideration for coaches when designing more systematic and

structured training programs. In competitive sports, proper development processes are essential throughout the training stages (Mubarok et al., 2022).

CONCLUSION

The conclusion of the study titled "VO2MAX Profile of Pre-PORPROV Futsal Athletes from Kendal Regency in 2025" indicates that the athletes' VO2Max endurance levels are considerably vary. Based on the measurements conducted using the Multistage Fitness Test (bleep test), the average VO2Max value was found to be 44.5 ml/kg/min. This result suggests that, in general, the aerobic capacity of the 2025 Kendal Regency Pre-Porprov Futsal athletes falls within the "fair" category.

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