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<https://ejournal.upi.edu/index.php/penjas/article/view/65095>DOI: <https://doi.org/10.17509/jpjo.v9i1.65095>**Characteristics of Semi-Professional Futsal Players based on Playing Positions****Agung Dwi Juniarsyah**

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**Article Info***Article History :**Received December 2023**Revised February 2024**Accepted March 2024**Available online April 2024**Keywords :**aerobic capacity, anthropometry, futsal player characteristics***Abstract**

The dynamic development of futsal in Indonesia has encouraged more in-depth research into the physiological characteristics of futsal players. Futsal games have intermittent high intensity, requiring players to continue to move actively together during the match. An equal level of physical condition between players makes it easier for coaches to determine the strategy to use. The aim of this research was to determine differences in anthropometry, aerobic capacity, agility aspects, and speed of semi-professional futsal players based on their playing positions. The method used in this research was an observational study with a quantitative approach. The research subjects consisted of 24 semi-professional futsal players from Bandung city. The results of this study showed that there were significant differences in height and weight variables between goalkeepers and players in other positions ( $P < 0.05$ ). In the aerobic capacity variable, there was a significant difference between goalkeepers and players in other positions ( $P < 0.05$ ). However, there were no significant differences in the speed and agility variables for all semi-professional futsal players. This study showed that the goalkeeper anthropometry was higher than the field players (pivot, anchor, and flank), while the aerobic capacity of the goalkeepers was lower compared to the field players (pivot, anchor, and flank). There was no difference in speed and agility. Field players had the same physical abilities. The results of the research can be the basis for further research regarding the physical condition needed based on playing positions.

## INTRODUCTION

The development of futsal in Indonesia is very rapid, as evidenced by the participation of the Indonesian national futsal team in several international events. The best achievement by the Indonesian national futsal team was winning the AFF Futsal Championship in 2010 held in Vietnam. Although they have not yet achieved maximum results on a broader scale, such as in Asia and the world, the Indonesian national futsal team ranks better compared to the Indonesian national football team. The latest data indicates that the Indonesian futsal team is ranked in the top 50 in the world, specifically 37th, which is better than the Indonesian football team ranked at 165 (FIFA, 2020). Player development is needed to improve the competitiveness of the national team in the future in terms of technique, tactics, and physicality. Additionally, the number of practitioners playing competitively or recreationally has increased in recent years (Méndez-Dominguez et al., 2022). Knowledge of physical condition requirements is essential to identify player talents based on position needs.

Futsal players are categorized into four positions: goalkeeper, pivot, flank, and anchor (Caetano et al., 2015; Ohmuro et al., 2020). Several studies have reported significant differences in physical characteristics between playing positions in other sports, such as soccer, rugby, and basketball (Austin & Kelly, 2013; Di Salvo et al., 2007). Numerous studies on futsal have been conducted by sports scientists, both from Indonesia and abroad. A 2008 study reports that futsal players from Latin America have an average height of 170-182 cm (Álvarez et al., 2009; Castagna et al., 2009; Makaje et al., 2012), which differs from studies involving Indonesian futsal players with an average height of 165-172 cm (Juniarsyah et al., 2017, 2019).

Another study on the physiological characteristics of futsal players concludes that professional futsal players from Latin America have a VO<sub>2</sub>max ranging from 52-58 ml/kg/min (Álvarez et al., 2009; Ayarra et al., 2018; Caetano et al., 2015; Castagna et al., 2009; Education, 2011; Romero et al., 2020), while professional Indonesian futsal players have a VO<sub>2</sub>max ranging from 45-52 ml/kg/min (Juniarsyah et al., 2017). When a futsal match is played, it results in an average heart rate of 83% to 86.4% of the maximum heart rate (85% > HR<sub>max</sub>), making it a high-intensity sport (Makaje et

al., 2012).

However, only a few studies focus on the physiological characteristics of semi-professional players based on playing positions. This is important for youth player development to enhance the competitiveness of the Indonesian national futsal team in the future. Having player data and the physical demands of futsal matches is the foundation for planning training programs. Therefore, this study aims to (1) compare the anthropometric characteristics of semi-professional futsal players based on their positions; and (2) compare the aerobic capacity (VO<sub>2</sub>max), speed, and agility of semi-professional futsal players based on their positions.

## METHODS

The method used in this research was an observational study with a quantitative approach. The research subjects consisted of 24 semi-professional futsal players, classified as trained athletes based on McKay (2022), with a minimum training frequency of 3 times per week and prepared for competition. The subjects, with an average age of 20, were from the Porda Kota Bandung team. All research subjects spent an average of 8-10 hours training per week and had 5 years of futsal experience. All research subjects were healthy, without cardiovascular diseases, asthma, and were non-smokers. All research subjects consumed light food an hour before testing and wore appropriate sports clothing and shoes for testing. Oral and written explanations were provided to all research subjects before conducting the research regarding the objectives, procedures, and risks. Informed consent was required from research subjects if they decided to participate in this study. The Ethics Committee of Research at the Ministry of Health POLTEKKES Bandung approved this research protocol, with ethics number 09/KEPK/EC/III/2021.

### Design

This study used an observational study method without a control group. The research subjects did not receive any intervention, so data collection was conducted once. The sample was determined by purposive sampling of the Porda Kota Bandung futsal team, which passed the continuous selection stage.

**Procedure**

A stadiometer was used to measure height, with subjects facing forward, standing upright without shoes. Weight and BMI measurements were taken using the Omron Carada Scan Body Fat instrument. VO2max was measured using the field method with a bleep test. The bleep test was conducted indoors on a flat surface. Subjects ran back and forth along a 20-meter line to match the rhythm from an active speaker in the testing area. The signal from the active speaker increased in speed every minute. The test ended when subjects could no longer keep pace with the signal from the speaker and failed to reach the target line twice consecutively. The bleep test included 21 levels with 16 turns used to predict VO2max values. Speed was measured using a 20-meter sprint, and agility was measured using a 4x10 meter shuttle run.

**Data Analysis**

The study used the Kolmogorov-Smirnov test to determine the normality of variable distribution, and one-way ANOVA to determine the differences in average values of semi-professional futsal players based on their positions. Statistical analysis used SPSS version 22 with a significance level of  $p < 0.05$ .

**RESULT**

All variable data in this study were normally distributed after being tested using the Kolmogorov-Smirnov test. Table 1 shows the average age, weight, height, and BMI of the research subjects.

**Table 1.** Research Subjects Data

Variable	Goalkeeper	Pivot	Flank	Anchor
Age	19.87±1.86	20.22± 0.96	20.34±0.85	20.32±0.77
Height (cm)	175.55±3.92*	170.15±3.21	167.55±4.31	167.74±3.12
Weight (kg)	71.23±4.8*	60.67±3.87	57.67±4.91	57.23±4.76
IMT	23.2±1.8	21.1±0.9	20.4±2.8	20.4±0.9

\*Significant differences ( $P<0,05$ ) between pivot, flank, dan anchor position

**Table 2.** Aerobic Capacity, Speed, and Agility

Variable	Goalkeeper	Pivot	Flank	Anchor
Aerobic Capacity (ml/kg/min)	45.29±1.82*	49.12±2.01	50.33±2.92	49.43±2.23
Speed (m/s)	3.24±0.22	3.17± 0.16	3.14±0.10	3.19±0.21
Agility (s)	12.20±0.37	11.47±0.22	11.7±0.43	11.46±0.34

\*Significant differences ( $P<0,05$ ) between pivot, flank, dan anchor position

Analysis revealed no significant differences in age and BMI, but there were significant differences in

weight and height between groups, with a  $p$ -value  $< 0.05$ .

Table 2 shows the average measurements of aerobic capacity, speed, and agility of the research subjects. Analysis revealed no significant differences in agility and speed variables, but there were significant differences in aerobic capacity,  $p < 0.05$ .

**DISCUSSION**

The research focuses on comparing the aerobic capacity (VO2max), agility, and speed of semi-professional futsal players based on their playing positions. The research subjects were semi-professional futsal players from Bandung City with an average age of 20, classified as late adolescents according to the World Health Organization (WHO) and the Ministry of Health of the Republic of Indonesia (Muljati, 2016; WHO, 2018). Significant differences in height and weight were found between goalkeepers and anchor, flank, and pivot players. Our research shows that goalkeepers have a taller stature compared to other groups. The same applies to the weight variable, where goalkeepers are heavier than anchor, flank, and pivot players. There were no significant differences in weight and height among anchor, flank, and pivot players. Our findings are consistent with previous studies indicating that elite and sub-elite level futsal goalkeepers tend to be taller and heavier compared to players in anchor, flank, and pivot positions (Baroni, 2012; Berdejo-del-Fresno et al., 2015).

The greater weight of goalkeepers compared to anchor, flank, or pivot players is attributed to their shorter sprint distances and limited running during

training or matches compared with anchor, flank, and pivot. This is corroborated by previous research findings (Baroni, 2012; Ramos-Campo et al., 2014). Additionally, different tactical needs by coaches during matches make the role of goalkeepers crucial, with coaches often selecting goalkeepers with not only good physical, skill, and technical attributes but also taller and heavier bodies to cover the 3-meter wide and 2-meter high 2-meter-high futsal goal. Further research on this phenomenon is necessary to determine the exact body composition, such as fat percentage, muscle percentage, and other body components for more objective assessments.

Further, this study found significant differences in aerobic capacity (VO<sub>2</sub>max) between goalkeepers and anchor, flank, and pivot players. Previous studies indicated that goalkeepers tend to focus on anaerobic strength and explosive power in training and matches, thus showing lower running ability and aerobic strength (Najafi, 2015). Interestingly, with the current development of futsal, goalkeepers are required to assist in attacks, not only guiding the last defense of the play, making good aerobic capacity necessary for meeting high match demands both defensively and offensively.

The difference in the role of goalkeepers compared to field players (anchor, pivot, and flank) during matches contributes to the differences in aerobic capacity between these groups. Our findings align with previous research concluding that goalkeepers have lower aerobic capacity (VO<sub>2</sub>max) than anchor, pivot, and flank players (Baroni, 2012; Berdejo-del-Fresno et al., 2015; Najafi, 2015). No significant differences in aerobic capacity (VO<sub>2</sub>max) were found among anchor, pivot, and flank players in this study. However, flank players had the highest aerobic capacity (VO<sub>2</sub>max), though not significantly different. The higher VO<sub>2</sub>max in flank players is due to their dual defensive and offensive roles during matches. Flank players are required to run long distances in each game, necessitating high aerobic fitness. Field players in futsal must have good aerobic capacity due to the smaller field size, which involves all players in both attack and defense, since all futsal players are involved on the field in any condition. Good aerobic capacity is related to less fatigue g baik berhubungan dengan kelelahan yang terjadi (Beato, 2017);, higher aerobic capacity results in less fatigue. The research findings align with previous studies indicating

that flank players have higher VO<sub>2</sub>max compared to anchor and pivot positions (Caetano et al., 2015; Ohmuro et al., 2020). It is intriguing to conduct further research on the role of goalkeepers in futsal matches. With the evolution of modern futsal, goalkeepers are now required not only to prevent goals but also to actively participate in offensive plays.

Speed and agility are as crucial as aerobic capacity (VO<sub>2</sub>max) in futsal. Previous research indicates a correlation between sprinting ability and agility in futsal players. On average, futsal players perform sprints 26 times in a single match (Spyrou, 2020). Consequently, it has been concluded that to improve agility, futsal players must train to enhance their sprinting ability (Berdejo-del-Fresno et al., 2015). The research findings on agility and speed variables indicate no significant differences across all groups of players studied. This supports previous studies showing that futsal players in all positions including goalkeeper, anchor, flank, and pivot have relatively similar speed and agility (Ayarra et al., 2018; Caetano et al., 2015). In addition, other research utilizing small-sided games training over six consecutive weeks with elite futsal players found no significant differences in agility and speed among all player positions, including goalkeepers and field players (anchor, flank, and pivot) (Berdejo-del-Fresno et al., 2015).

This study has several limitations. Physical components such as local muscle endurance and local muscle strength were not measured for all subjects. Additionally, body composition assessments were not conducted, so these data were not collected. Increasing the sample size, potentially including participants from across Indonesia, would provide a more accurate depiction of the physical characteristics associated with different playing positions. Further research is needed to measure player performance during matches to clearly identify the physical demands of each position. Meanwhile, coaches and sports scientists can use this information to plan futsal training sessions tailored to playing positions and tactical needs. This data is essential for identifying talented players and enhancing the level of regional and national futsal players to compete at higher levels.

## CONCLUSION

Based on the results and discussion of this study, it can be concluded that the anthropometric measurements of goalkeepers, indicated by height and weight, were greater than those of other field players. In contrast, goalkeepers had a lower aerobic capacity compared to other field players. However, there were no significant differences in speed and agility across all player groups. Field players had similar physical condition abilities, distinct from goalkeepers. These findings are expected to serve as a foundation for future research on the physical condition needs of futsal players based on their playing positions and to assist coaches and talent scouts in selecting players suited to their positions.

## ACKNOWLEDGEMENT

The authors express their gratitude to the participants for their invaluable contributions to this research.

## CONFLICT OF INTEREST

The authors declared no conflict of interest.

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