



Research Article

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Analysis of Speed, Power and Agility of Football Players Reviewed from Age Differences

Ghozi Indra Waskita¹, Awan Hariono², Paryadi³, Kevin Ramadhan⁴, Dewangga Yudhistira⁵

^{1,2} Faculty of Sport Sciences and Health, Universitas Negeri Yogyakarta, Indonesia

³ Faculty of Teacher Training and Education, Mulawarman University, Indonesia

⁴ Postgraduate Student, Universitas Negeri Jakarta, Indonesia

⁵ Faculty of Sport Sciences, Universitas Negeri Semarang, Indonesia

Abstract

Physical profile in soccer is one of the important things to determine a training program, but analysis that focuses on aspects of speed, power, and agility based on age categories has not been carried out by coaches. The purpose of this study was to analyze the speed, power, and agility of soccer players in terms of age differences. The research method is quantitative descriptive with a survey approach, participants are soccer players aged 14-15, 16-17, 18-19 years totaling 60 males, test instruments are 30-meter run, 80-meter run, illinois run, and standing broad jump. Survey and test data collection techniques, Kruskal Wallis test data analysis techniques and post hoc tests. The results found a variable speed of 80 meters there was a significant difference in age 14-15 and 18-19 years' sig value of $0.000 < 0.05$, age groups 16-17 and 18-19 years there was a significant difference in sig value $0.013 < 0.05$, while age 14-15 and 16-17 years there is no significant difference sig value $0.042 > 0.05$. The agility variable has a significant difference in age 14-15 and 18-19 years sig value $0.000 < 0.05$, there is a significant difference in age 14-15 and 16-17 years sig value $0.000 < 0.05$, while age 16-17 and 18-19 years there is no significant difference sig value $0.458 > 0.05$. It is concluded that chronological age affects the performance obtained, especially agility and speed. Hopefully, this research will be useful for coaches as a basis for evaluation and preparation of training programs. Further research is expected to look at other aspects such as gender differences, body mass index, and differences in player position.

Keywords: Analysis, Speed, Power, Agility, Football Player

INTRODUCTION

Soccer is a team sport. It is played by eleven teams facing each other to get the ball into the net [1]. Nowadays soccer is a familiar sport. Football can be played by anyone with the aim of recreation, health, and achievement. Talking about the achievement, there are so many things that must be studied such as aspects of psychology, physiology, technique, tactics, and physicality. One of the determinants of victory in soccer is excellent physical condition [2]. We can analyze, soccer movements require physical elements such as dribbling, receiving, kicking, and heading along with running. This cannot be achieved perfectly when the physical aspect is inadequate.

Physical aspects in soccer such as flexibility, endurance, strength, speed, power, and agility [3]. Some components that are often studied such as speed, power, and agility [4]. These three components are one of the important studies in soccer. Why? because in every match the movements in soccer are done quickly and explosively. Previous studies state that speed, power, and agility are the dominant motor components in soccer [5]. Most of the speed and agility used in soccer such as passing opponents, blocking opponents, dribbling along running. Likewise, power is needed when players kick, jump, jump, and so on. Therefore, the role of the coach is important as it has teaching, management, leadership, and analytical skills to optimize team performance [6]. One of the analytical principles of a coach is to test, measure, and evaluate these biomotor components as a basis for preparing physical training programs and evaluating performance.

There have been many studies related to surveys of soccer physical conditions such as research from Mahendra et al [7], Akhiruyanto et al [8], Asy'ary [9], Suryadi [10], and Umam [11]. Some of the above studies only provide a general description of the condition of soccer players. If you look back, the studies related to the survey of the physical condition of soccer players are only limited to reporting description

*Corresponding author:

Ghozi Indra Waskita

Faculty of Sport Sciences and Health, Universitas Negeri Yogyakarta, Indonesia
Email: ghozimbuh@gmail.com

research. This certainly gives the author doubts regarding the contribution and novelty that can be given to practitioners and academics is still not optimal.

Other relevant research was found that analyzed strength, power, and agility in basketball players in terms of age [12]. But unfortunately, the sample used at each age is only seven people so the conclusions cannot be generalized properly. According to the author, the research is interesting to study further even though the sample used is basketball players. This became one of the author's research materials applied to soccer samples.

In addition, the author made observations at an amateur soccer club that has not been developed for a long time, which in fact human resources cannot be said to be optimal. Several coaches stated that physical condition measurement tests in the club had not been carried out. The coach realizes that tests and measurements are needed. However, limited facilities and infrastructure are some of the obstacles to conducting tests and measurements. This is also the basis for the author to conduct a study

Although many researchers have examined various aspects of physical condition in the soccer team, previous research is only limited to knowing the results in a quantitative descriptive manner which is then presented, in-depth analysis such as looking at age comparisons is still lacking attention. In this context, this research plays a role in filling the gap of previous research by analyzing comprehensively. The purpose of this research is to analyze physical conditions focused on speed, power, and agility in terms of age categories and beginner soccer players. Therefore, this research is expected to provide meaningful contributions and novelty to the understanding and evaluation of soccer players

MATERIAL AND METHODS

This research method is descriptive quantitative with a survey approach, which is to describe the data from the results obtained so as to get research conclusions [13, 14]. The sampling technique used purposive sampling. Participants in this study amounted to 60 soccer players aged 14-19 years. Inclusion criteria are soccer players actively participating in a soccer club, have no history of injury, obey what the tester instructs, and take the test well. Participants were divided by age group 14-15 years totaling 20 people, age 16-17 totaling 20 people, and age 18-19 totaling 20 people. The average overall body weight is \pm 50-73 kilograms, and height is 158-178 centimeters. In this study, the aspects measured were 30-meter running speed, 80-meter running speed, agility, and leg muscle power.

This study aims to analyze differences in the physical condition of soccer players aged 14 years to 19 years specifically on the physical components of speed, agility, and power. The instruments for measuring speed are the 30-meter and 80-meter running tests, the instrument for agility is the Illinois agility run, and the leg muscle power instrument is the standing broad jump. The author uses this instrument because this test is relatively simple and economical. The author's test implementation procedure is assisted by 5 people to help the test run smoothly. The tester guides soccer athletes to do static and dynamic warm-ups for 15-20 minutes. The first test performed was a 30 and 80-meter run for 2 attempts taken the best. The second test is an agility test using the Illinois agility run for 2 attempts taken the best. The third test is the leg muscle power test standing broad jump done for 2 attempts taken the best.

The data described is a quantitative descriptive analysis including mean, minimum, maximum, and standard deviation values. Then the comparison test using the Kruskal Wallis nonparametric comparison test, then continued with the post hoc test to analyze which group is better [12]

RESULTS

The results of the description of physical aspects including speed, agility and power are presented in table 1 as follows:

Table 1: Data description results of speed, agility and power of youth soccer players

Age	Category	N	Mean	Min	Max	Std.Deviation
14-15	30 meters speed	20	4.34	5.44	4.68	0.25165
	80 meters speed	20	11.43	10.54	13.38	0.74078
	Leg muscle power	20	4.68	4.34	5.44	0.25165
	Agility	20	18.05	16.97	20.49	0.88881
16-17	30 meters speed	20	4.56	4.21	5.07	0.25948
	80 meters speed	20	10.95	10.19	12.41	0.58293
	Leg muscle power	20	2.21	1.91	2.62	0.17543
	Agility	20	15.92	14.19	17.65	0.84289
18-19	30 meters speed	20	4.49	4.16	4.81	0.15551
	80 meters speed	20	10.48	9.69	11.27	0.41577
	Leg muscle power	20	2.28	2.50	2.00	0.15244
	Agility	20	15.68	15.03	17.19	0.53516

The results of the difference test using Kruskal Wallis are presented in table 2 as follows:

Table 2: Kruskal Wallis difference test results of speed, power, and agility

Variables	Significance	Description
30 meters speed	0.046	Not Significant
80 meters speed	0.000	Significant
Agility	0.000	Significant
Leg muscle power	0.079	Not Significant

Based on Table 2 above, it has been found that the Kruskal Wallis test on the 30-meter speed variable has a significance value of $0.046 > 0.05$, meaning that there is no significant difference between the age groups of 14-15, 16-17, and 18-19 years. The 80-meter speed variable significance value is $0.000 < 0.05$, meaning that there is a significant difference between age groups 14-15, 16-17, and 18-19 years. The variable agility significance value is $0.000 < 0.05$ meaning that there is a significant difference between age groups 14-15, 16-17, and 18-19 years. The variable power significance value of $0.079 > 0.05$ means that there is no significant difference between age groups 14-15, 16-17, and 18-19 years. In the description, it has been explained that there is a significant difference between 80 meters speed and agility, but it needs more in-depth testing using post hoc tests to see a comprehensive analysis.

The results of the 80-meter speed post hoc test are presented in table 3 below as follows:

Table 3: Post hoc test results of 80-meter speed

Sampel	Test statistic	Std.error	Std. test statistic	Sig.	Adj.Sig
18-19 - 14-15 years	25.235	5.545	4.551	0.000	0.000
18-19 - 16-17 years	13.835	5.545	2.495	0.013	0.038
16-17 - 14-15 years	11.400	5.612	2.031	0.042	0.127

Based on table 3 above, it has presented the post hoc results of the 80-meter speed variable, it can be seen that the comparison of ages 18-19 and 14-15 years has a significance value of 0.000, meaning that there is a significant difference, then it can be seen that the comparison of ages 18-19 and 16-17 years has a significance value of 0.013, meaning that there is a significant difference. In addition, below can be presented an image on the yellow line that is interconnected showing there is a significant difference as follows

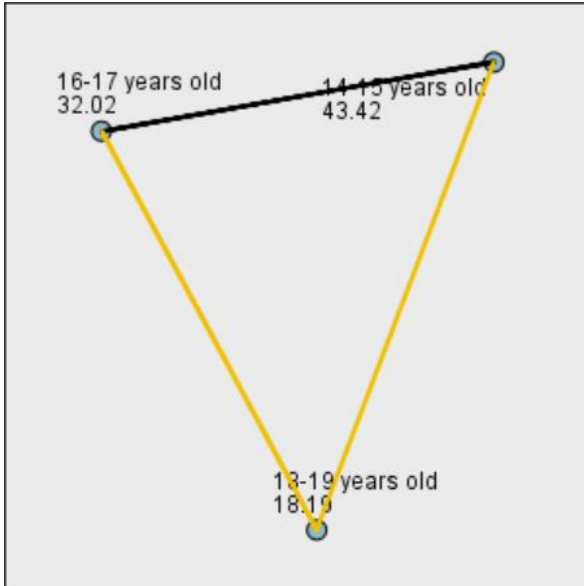


Figure 1: Pairwise comparisons of age

Table 4: Agility post hoc test results

Sampel	Test statistic	Std.error	Std. test statistic	Sig.	Adj.Sig
18-19 – 16-17 years	4.118	5.546	0.742	0.458	1.000
18-19 – 14-15 years	31.393	5.546	5.660	0.000	0.000
16-17 – 14-15 years	27.275	5.613	4.859	0.000	0.000

Based on table 4 above, it has presents the results of post hoc agility, it can be seen that the comparison of ages 18-19 and 16-17 years gets a significance value of 0.000, meaning that there is a significant difference, then it can be seen that the comparison of ages 16-17 and 14-15 years gets a significance value of 0.000, meaning that there is a significant difference. In addition, below can be presented an image on the yellow line that is interconnected showing there is a significant difference as follows

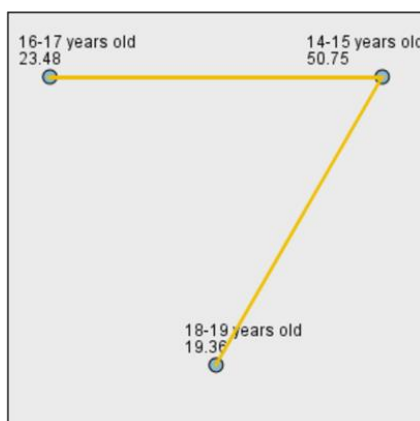


Figure 2: Pairwise comparisons of age

DISCUSSION

The purpose of this study is to analyze the physical condition focused on aspects of speed, agility, and power in terms of age differences between 14-15, 16-17, and 18-19 years. Based on Kruskal Wallis testing, the results obtained show that there is no significant difference in the 30-meter speed variable with a significance value of $0.046 > 0.05$, while the 80-meter speed variable has a significant difference with a significance value of $0.000 < 0.05$. Then the agility variable has a significant difference with a significance value of $0.000 < 0.05$, but in the power variable, there is no significant difference with a significance value of 0.079.

Based on the results obtained, there are two variables that have significant differences, namely 80-meter running speed and agility. However, a more in-depth analysis is needed followed by a post hoc test. The results of the post hoc test on the 80-meter speed variable there is a significant difference in the 14-15 and 18-19 year age groups with a significance value of $0.000 < 0.05$, then in the 16-17 and 18-19 year groups there is a significant difference with a significance value of $0.013 < 0.05$, while the comparison of the 14-15 and 16-17 year groups has no significant difference with a significance value of 0.042.

Then in the agility variable, there is a significant difference between the 18-19 and 14-15 year age groups with a significance value of $0.000 < 0.05$, and the 16-17 and 14-15 year age groups have a significant difference with a significance value of $0.000 < 0.05$, while in the 16-17 and 18-19 year groups there is no significant difference with a significance value of 0.458. This means that age differences have an influence on physical aspects such as the speed and agility of youth soccer players.

Studies Uzun et al conducted research related to physical condition analysis with the results that there were positive differences related to aspects of speed and agility at the age of 13 years ranging from 12-13 years, then there were positive differences related to aspects of speed and agility at the age of 14 years ranging from 13-14 years [15]. This means that this study is in line with the author's study that age makes a significant difference in physical aspects. This is one of the considerations in sports activities and academic studies conducted to optimize achievement that the training program must be in accordance with the age category. In line with other studies in rugby, it shows that there is a significant difference between the age of 14 years compared to the ages of 16 and 18 years on the variable of running speed, meaning that running speed distinguishes players from age categories [16]. Another recent study on speed and power profiles in relation to gender and age found that there were significant differences between age and gender on variables related to training time and load, and variables related to stride, contact, and flight [17]. This means that training planning should be individualized and according to the characteristics of the athlete [17].

Therefore, knowing the physical condition profile through tests and measurements is very important for athletes and coaches. Test and measurement is an important activity to provide an overview of physiological, psychological, skill, and physical profiles. This is important to facilitate graphic representation and understanding of variables that provide a comprehensive picture of the object of study under study [18]. The subject of this study is in the sport of soccer which is focused on conducting tests, measurements, and evaluations of physical conditions. Soccer is a sport that requires physical aspects in various lines.

Through tests and measurements, the coach can find out the physical abilities of his athletes. In addition, the coach is able to plan and improve aspects that are felt to be not optimal. The current condition is that more or the coach has implemented tests and measurements, but in detail analyzing age differences has not been done much. This is

what underlies the author to conduct this research. In addition, when discussing physical aspects, of course, the analysis must be done carefully, especially physical aspects such as speed, power, and agility.

Looking deeper, physical aspects such as speed, agility, and power are movements that are done quickly, and strongly in a short time. This means that exercise planning must be properly programmed. Looking at the training guidelines by the theory of long-term athlete development ages 14-19 years must still integrate, develop, and optimize speed, flexibility, and strength training so that power and agility can increase properly^[19]. However, the approach and dosage of training at each age is different, this is a special concern for coaches who must be able to apply the principles of training individually and specifically so as not to cause injury. This research is more focused on the physical aspects of speed, power, and agility and is only reviewed from the age category, it is hoped that further research can review more in-depth such as seen from gender, training age, body mass index, and so on.

CONCLUSION

Based on the results and discussion that has been described, it can be concluded that there is a significant difference in the 80-meter running speed variable between ages 14-15 years and 18-19 years, ages 16-17 years, and 18-19 years. Then there is a significant difference in the agility variable between ages 14-15 years and 16-17 years, ages 14-15 years, and 18-19 years. This means that chronological age is one of the bases for adjusting training and setting a good training dose. Therefore, this research is expected to be useful for trainers as a basis for compiling training programs, besides being useful for academics to add to the latest references. However, this study has several limitations such as not only using male samples even though the female gender needs to be studied, not reviewing according to the position in the soccer game, and not reviewing based on body mass index categories. This means that future research is expected to conduct more comprehensive research.

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Conflict of Interest

None declared.

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