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Analysis of the Level of Physical Condition of Persis Solo U-20 Football Athletes in 2024

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ABSTRACT

The physical condition of players is crucial for achieving maximum performance. This study aims to analyze the physical condition level of Persis Solo U20 players based on the physical tests that will be conducted. This research is a survey study with a descriptive design. The subjects of this study are all 25 football athletes of Persis Solo U20. The data collection technique uses a survey with a test instrument consisting of six test items: the 20-Meter Sprint Test (Speed), Arrowhead (Agility), Standing Long Jump (Power Strength), Push-Up (Strength), Sit-Up (Strength), and Yo-Yo Intermittent Recovery Level 2 (Endurance). The data analysis technique employs descriptive analysis with percentages based on classification norms, which are then processed into T-scores to determine the physical condition levels of Persis Solo U20 football athletes. The results of the descriptive statistical test show that. The speed component (Speed) has an average of 2.92, with most athletes (13 athletes or 52%) falling into the "excellent" category. The agility component (Agility) has an average of 16.98, with most athletes (13 athletes or 52%) in the "moderate" category. The explosive power component (Power Strength) has an average of 2.34, with most athletes (13 athletes or 52%) in the "poor" category. The abdominal muscle strength component (Strength) has an average of 57.4, with most athletes (21 athletes or 84%) in the "very poor" category. The arm muscle strength component (Strength) has an average of 33.56, with most athletes (9 athletes or 36%) in the "very good" category. The endurance component (Endurance) has an average scale score of 20.26, with most athletes (9 athletes or 36%) in the "moderate" category. Overall, the physical condition has an average score of 301.772. Based on the classification norms, the physical condition falls into the "moderate" category, with most athletes (10 athletes or 40%) in this category.

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1. INTRODUCTION

Around the world, soccer is a widely played and easily understood sport. The essence of the game is what makes soccer so special. Soccer is a mentally and physically demanding sport due to the time constraints faced by players during a match (Rohim, 2008). Each side has eleven players, with one player acting as goalkeeper, and the game is played between two teams (Sucipto, et al: 2000).

One of the most important aspects of playing soccer is maintaining a high level of physical fitness. When defending or attacking, soccer players are good examples. When the going gets tough, they must move quickly or they will lose control of the ball in the air. Endurance, local endurance, strength, speed, flexibility, and explosiveness are components of physical conditioning that soccer players must strive for (Irianto, 2016). The use of muscle strength is very important to maintain correct posture so as not to fall when physically colliding with an opponent. When a player needs to perform a powerful movement, such as jumping to head the ball or kicking the ball, they use explosive power. When players need to get into a better position or win the ball, they use speed. The ability to dribble the ball quickly and accurately is very important for players because it allows for better ball circulation and more precise transfers. To be able to run, dribble, kick, or perform a combination of these movements repeatedly during a game, players need muscle endurance. Runners need cardiorespiratory endurance to perform slow to moderate running movements in a race.

A person's physical condition is influenced by many things, according to Irianto (2004). First of all, a healthy diet is very important for many bodily functions, including development, cell regeneration, maintenance of condition, and increased physical activity. The level of physical activity, age, gender, and overall health all play a role in determining a person's dietary needs. The human body needs water, fat, carbohydrates, vitamins, and minerals in addition to the six essential nutrients. Second, due to its limited capacity to function continuously, the human body has a high priority for sleep and rest. Adequate rest is necessary for the body to recover and support daily activities optimally. Fatigue is a sign of limitations in human bodily function. Third, a healthy lifestyle plays a major role in maintaining physical fitness. This includes eating clean and nutritious foods (such as the "four healthy five perfect" diet), maintaining personal hygiene (including bathing and maintaining clean teeth, skin, and hair), and avoiding bad habits such as smoking, drinking alcohol, or using illegal drugs. Fourth, a person's long-term living environment also affects their physical condition, whether physically, socially, or economically. Factors such as physical environment, work, lifestyle, and economic conditions can affect a person's physical well-being. Fifth, exercise and sports have a significant impact on improving a person's physical condition. Through regular exercise tailored to individual needs, a person can achieve optimal fitness levels. Exercise not only provides physical benefits but also psychological and social benefits. By considering all these factors, soccer players or anyone else can improve their physical condition effectively and safely.

Based on field observations after the competition break, the Persis Solo U-20 team is preparing for the second round of the group stage of the 2024/2025 season. Therefore, it is necessary to measure physical condition data such as endurance, agility, flexibility, strength, and power. This physical condition data is highly valuable for coaches and players. According to Nawan Primasoni (2018), measuring physical condition data can be used to determine the progress that has been made, understand the strengths and weaknesses of the players, help players understand the purpose of the training program, increase player motivation for training, and be used to create a team profile based on the team's strengths and weaknesses. It can also serve as a good indicator in the improvement process.

Therefore, it is interesting to examine and assess the physical fitness levels of soccer club players as they prepare for matches. Improving players' physical condition is a major concern for coaching staff when preparing for matches. The coaching staff's training program needs to help players achieve better physical condition.

Berkaitan dengan penjelasan diatas, bahwa kondisi fisik merupakan pondasi penting untuk mencapai prestasi naksimal maka dari itu akan dilakukan penelitian di Persis Solo U-20. Atas dasar itu peneltian ini berjudul "Analisis Tingkat Kondisi Fisik Atlet Sepakbola Persis Solo U-20".

2. METHODS

This research design is in line with quantitative descriptive research, which is a type of research methodology that aims to explain or accurately describe events or issues that have occurred or are currently occurring. The descriptive method is a research approach that aims to define or characterize who participates in an activity, what is done, where it is done, and how it is done, according to Jogiyanto (2004).

The research subjects were the sources of information or informants needed in the data collection process for this study. The subjects in this study were fifty-five Persis U-20 soccer players.

The instruments used here to collect data on the physical condition of Persis Solo U20 players were obtained from tests such as: 20-meter sprint test (speed), Arrowhead agility test (agility), standing long jump test (power), push-up test (strength), sit-up test (strength), and the Level 2 Intermittent Yo-Yo Test (Endurance). The data obtained from each test is included in the raw data from the test results achieved by the players. These results are then classified according to the scores achieved in accordance with the previously established sections or categories. The following is a table of the components and classifications of the players' physical abilities.

Table 1. Components of Physical Ability Classification in Soccer

No	Component	Measurement Technique	Classification				
			Poor	Fair	Average	Good	Very Good
1	Speed	Sprint 20 Meter	5.12 – 5.50	4.73 – 5.11	4.35 – 4.72	3.92 – 4.34	< 3.58 – 3.91
2	Agility	Arrow Head	>18.0	17.0-18.0	16.0-17.0	15.0-16.0	< 14.0-15.0
3	Leg Muscle Power	Standing Long Jump	< 2.0	< 2.3	< 2.5	< 2.7	< 3.0
4	Upper Body Strength	Push Up	>10	20-11	30-21	40-31	< 50-41
5	Abdominal Strength	Sit Up	>10	20-11	30-21	40-31	< 50-41
6	Physical Endurance	Yoyo Interminten Recovery Level 2	< 240	240-440	480-640	680-840	> 880

Table 2. Formula for Categorizing Physical Conditions Using Mean and Standard Deviation

No	Formula or Interval	Category
1	X > (M + 1,5 SD)	Very Good
2	(M + 0,5 SD) ≤ X < (M + 1,5 SD)	Good
3	(M – 0,5 SD) ≤ X < (M + 0,5 SD)	Average
4	(M – 1,5 SD) ≤ X < (M – 0,5 SD)	Poor
5	X < (M – 1,5 SD)	Very Poor

After determining the physical condition of Persis Solo U20 soccer players, who fall into the categories listed in the table above, the percentage will be determined. The percentage is calculated using the following formula:

$$P = \frac{f}{n} \times 100\%$$

Percentage of results (%)
Explanation:
f = frequency for which the percentage is being sought
n = Number of Cases (number of frequencies/number of individuals)
P = percentage figure (Sudjono, 2012)

3. RESULT AND DISCUSSION

Good physical condition can improve a player's performance in the game because it is believed that the better their fitness, the better they are at distributing oxygen throughout their bodies when playing soccer. Several aspects that support performance in the game include strength, speed, agility, power, and endurance. In line with the purpose of the study, which is to find out the condition of the Persis Solo U20 players, the following tests were used to assess and measure their physical condition:

a. Speed

Based on the description of data related to the physical condition of Persis Solo soccer players aged 20 years, which consists of speed components measured by the 20-meter sprint test Meter Test, with a mean or average of 2.9224 and a standard deviation of 0.21805. According to the 20-Meter Sprint Test norm, the average falls into the "very good" category. Based on the test results, it is hoped that Persis Solo U20 athletes can maintain this ability. Since speed is one of the physical condition elements that is highly needed in soccer.

b. Agility

The agility component, tested through the Arrowhead Test, yielded descriptive statistical test results showing an average value of 16.9820 with a standard deviation of 0.67722. According to the Arrowhead Test norm category, the average falls into the moderate category. Based on these test results, coaches must increase the intensity of training, especially in one aspect of fitness, namely agility (Agility), because soccer athletes must have a good level of agility to support their performance on the field.

c. Power Strength

The power strength component, which was tested using the Standing Long Jump Test, has a descriptive statistic with a mean or average Standing Long Jump value of 2.3464 and a standard deviation of 0.12939. According to the Standing Long Jump norm category, this category can be categorized as poor. Based on these test results, an evaluation is needed, particularly in the physical condition component of power strength, as this component is crucial for soccer athletes.

d. Strength

The strength component itself is divided into two aspects. The first is abdominal muscle strength, which was tested using the Sit-Up Test and showed descriptive statistical test results with an average of 57.48 and a standard deviation of 9.34077. According to the Sit-Up Test norm category, the average falls into the very poor category. The second is arm muscle strength, which is tested through the Push-Up Test, showing descriptive statistical test results. The descriptive statistical test results show that the average value of the Push-Up is 33.56 with a standard deviation of 11.39839. According to the 1-minute Push-Up norm category, the average is in the Good category.

Based on these results, it can be seen that the strength of the upper extremities, namely the arm muscles, is better than that of the abdominal muscles. Therefore, the strength of the arm muscles needs to be maintained. This is because arm muscle strength can also be interpreted as the ability of the muscles to withstand a given load.

e. Endurance

The endurance component was tested using the Yoyo Intermittent Recovery Level 2 Test. The descriptive statistical test results show that the mean value of the Yoyo Intermittent Recovery Level 2 Test is 53.2 with a standard deviation of 2.1682. According to the Yoyo Intermittent Recovery Level 2 norm category, the average is in the moderate category. Based on these results, the endurance component needs improvement. This is because optimal endurance is important for soccer players. This is because soccer athletes must endure a normal match duration of 2 x 45 minutes.

The results of the descriptive statistical test show that the mean or average physical condition of athletes is 301.7727017 with a standard deviation of 23.3350. According to the physical condition norm category, this falls into the moderate category. Below is a graph of the physical condition levels of Persis Solo U20 soccer athletes.

When viewed from the six components of physical condition, if ranked from the largest to the smallest, they are speed, arm muscle strength, endurance, agility, explosive power, and abdominal muscle strength. Thus, the best physical condition aspects are seen in the speed component, which is categorized as very good, and arm muscle strength, which is categorized as good. Meanwhile, the endurance component is categorized as moderate. Then, the worst physical condition test components are agility, which is in the poor category, and explosive power, which is in the poor category. Meanwhile, the very poor category is in abdominal muscle strength. An athlete's physical conditioning ability is the foundation for honing their tactical/strategic, psychological, and technical skills. Strong and persistent players will be an asset to any team. Conversely, tired players will find it difficult to concentrate and often make careless mistakes. Good physical condition is very important in soccer. Being physically fit is crucial in soccer because it provides a strong foundation for learning game strategies, tactics, and techniques. Therefore, it is important for Persis Solo U20 athletes to undergo regular and structured physical training to improve their physical condition. This will help them endure the long league competition and achieve maximum results in every match.

4. CONCLUSION

Research on the physical condition of 20-year-old Persis Solo soccer athletes yielded the following conclusions. The speed component had an average of 2.92. Most athletes were in the excellent category, namely 13 athletes (52%). The agility component had an average of 16.98. Most athletes were in the moderate category, namely 13 athletes (52%). The power strength component had an average of 2.34. Most athletes were in the poor category, namely 13 athletes (52%). The abdominal muscle strength component had an average of 57.4. Most athletes were in the very poor category, namely 21 athletes (84%). The arm muscle strength component had an average of 33.56. Most athletes were in the very good category, namely 9 athletes (36%). The endurance component has an average score of 20.26. Most athletes are in the moderate category, namely 9 athletes (36%). Overall physical condition has an average score of 301.772. According to the physical condition norm category, this falls into the Moderate category. Most athletes are in the adequate category, namely 10 athletes (40%).

AUTHOR'S STATEMENT

Stating truly that this artikrl is my own work and does not plagiarize the scientific work of others, either in whole or in part

REFERENCES

Abdul Rohim, (2008). Dasar-Dasar Sepak Bola. Demak : Aneka Ilmu.

Ade, J. D., Harley, J. A., & Bradley, P. S. (2014). Physiological Response, Time- Motion Characteristics, and Reproducibility of Various Speed- Endurance Drills in Elite Youth Soccer Players: Small-Sided Games Versus Generic Running. International Journal of Sports Physiology and Performance, 9(3, SI), 471–479.

Azidman dkk, (2017). Profil Kondisi Fisik Pemain Sepak Bola SMA Negeri 1 Kaur. Bengkulu: Universitas Bengkulu. Vol. 1, No. 1.

Bafirman & Wahyuri, Asep Sujana. 2019. Pembentukan Kondisi Fisik. Depok

Bahtra, Ridho. (2022). Buku Ajar Permainan Sepak Bola. Cetakan Pertama. Padang: Sukabina Press.

Bangsbo, Jens. (2003). Fitness Training in Soccer A Scientific Approach.

Bompa, O. Tudor. 1983. Theory And Methodology Of Training. Dubuque, Jowa: Kendal/Hunt Publishing company

Bompa, T. O., & Haff, G. G. (2009). Periodization Theory and Methodology of Training (Fifth Edit; M. S. Bahrke, ed.). United States: Human Kinetics

Cejudo A, Robles-Palazón FJ, Ayala F, De Ste Croix M, Ortega-Toro E, Santonja- Medina F, Sainz de Baranda P. 2019. Age-related differences in flexibility in soccer players 8–19 years old. PeerJ 7:e6236.

Djoko Pekik Irianto. (2004). Pedoman Praktis Berolahraga untuk Kebugaran dan Kesehatan. Yogyakarta. Andi Offset

Emral. (2017). Pengantar Toeri dan Metodologi Pelatihan Fisik. Jakarta: Kencana Pranemedia Grup.

Ferraz, R., van den Tillar, R., & Marques, M. C. (2017). The influence of different exercise intensities on kicking accuracy and velocity in soccer players. Journal of Sport and Health Science, 6(4), 462–467.

FIFA. (2015). FIFA COACHING MANUAL.FIFA.COM

Hardiansyah, S. (2018). ANALISIS KEMAMPUAN KONDISI FISIK MAHASISWA FAKULTAS ILMU KEOLAHRAGAAN UNIVERSITAS NEGERI PADANG Sefri Hardiansyah Program Studi Pendidikan Jasmani Kesehatan dan Rekreasi , Fakultas Ilmu Keolahragaan , Abstrak ANALYSIS THE ABILITY OF PHYSICAL CONDITIONS ST. 3, 117–123.

Harsono. (1988). Panduan Kepelatihan. Jakarta: KONI.

HPU PSSI. 2014. Kurikulum Pembinaan Sepakbola Indonesia. Jakarta. PSSI Hyballa, P., Dost, H., & Poel;, H.-D. te. (2016). Soccer Functional Fitness Training. Meyer & Meyer Sport.

Irianto, S 2016, 'Kebugaran Aerobik Pemain Sepakbola Psim Yogyakarta Tahun 2014 Subagyo Irianto Jurusan Pendidikan Kepelatihan FIK UNY', vol.12c,1–8

Jogiyanto, H. M. 2004. Metodologi Penelitian Bisnis: Salah Kaprah.

Luthan, Rusli. (2002). Menuju Sehat dan Bugar. Jakarta; Departemen Pendidikan dan Kebudayaan Direktorat Jenderal Pendidikan Tinggi.

Luxbacher, J. (2011). Sepakbola. Jakarta: PT Rajagrafindo Persada.