Analysis speed of junior sprint athletes of PASI (Persatuan Atletik Seluruh Indonesia) Banjarbaru city

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Abstract: This study aims to analyze the sprint speed performance of junior athletes from the Indonesian Athletics Association (PASI) in Banjarbaru City. Speed is a fundamental component of physical fitness that plays a crucial role in sprinting events, especially for young athletes who are in a critical phase of motor and physiological development. This research employed a descriptive quantitative method with total sampling involving 17 junior athletes. The primary instrument was a 60-meter sprint test, conducted twice with the best result used for data analysis. The recorded times were categorized according to established sprint assessment norms and analyzed using percentage distribution. The results showed that 52.94% of athletes fell into the Fair category, 35.29% were in the Poor category, and 11.76% were classified as Very Poor. Notably, no athletes were categorized as Good or Very Good. These findings indicate that the overall sprint speed of junior PASI Banjarbaru athletes remains at a moderate to low level, insufficient for higher-level competition. Contributing factors include suboptimal starting techniques, underdeveloped muscle strength, and the lack of scientifically-based and varied training methods. Therefore, a more structured, systematic training program tailored to the developmental characteristics of young athletes is essential to optimize their sprinting potential. This study is expected to serve as a foundation for evaluating and designing more effective training strategies focused on performance improvement for junior athletes in Banjarbaru.

Keywords: speed; sprint; junior athletes

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INTRODUCTION

Sports are one of the essential activities in human life, serving not only as a means of entertainment and recreation but also as an effort to maintain physical and mental health (Rizki et al., 2023). Since ancient times, sports have been an integral part of the culture in various countries and have evolved into a fundamental necessity in modern life.

Athletics is widely recognized as one of the most favored branches of sport across various age groups. Often referred to as the "mother of all sports," athletics incorporates fundamental movements that form the basis of nearly every other sport, such as walking, running, throwing, and jumping. Due to these foundational elements, athletics holds a central role in the world of sports. It also offers a diverse range of competitive events. Among them, running events attract the most interest, covering a spectrum from short-distance sprints, middle-distance runs, hurdles, and relays to long-distance races.

Running is a form of forward movement from one place to another that is performed at a higher speed compared to walking (Qomara et al., 2024). Sprint is one of the running events that requires athletes to run at maximum speed over a specific distance, typically ranging from 50 to 400 meters (Yuliawan & Septriasa, 2023). The main component of short-distance running events is maximum speed, starting from the initial phase start to the finish line (Yani & Hasri, 2020). Sprint is one of the most popular events in competitions such as O2SN, POPDA, POPNAS, and other national championships.

Along with the rapid development of athletics, there are strong indications that achievements in this sport will continue to improve, similar to other sports disciplines in Indonesia (Hadisman et al., 2021). Indonesian sprinter Lalu Muhammad Zohri has successfully established himself as one of the most promising young sprinters in the world through an outstanding achievement that marked a historic milestone for Indonesia on the international athletics stage. Recording a time of 10.18 seconds at the 2018 IAAF World U-20 Championships, Zohri not only challenged the dominance of sprinters from major countries but also opened a new chapter in the study of speed and sprinting technique among Indonesian athletes. This remarkable achievement continues to inspire both athletes and coaches to strive for growth and pursue future accomplishments.

The overall running motion begins when the foot first makes contact with the ground and ends when it touches the ground again, with speed being the primary aspect evaluated in this

activity (Adit & Henjilito, 2021). In short-distance running events, the most influential and dominant biomotor ability is speed (Mustakim et al., 2019). Speed is one of the key factors that determine an athlete's success in sprinting events. Mastery of basic techniques, muscular strength, and movement coordination all play a crucial role in achieving optimal race times (Handayani, 2022). At the junior level, the development of running speed plays a vital role, as this stage represents a golden period in the motor and physiological growth of athletes, which significantly influences their future performance potential.

Physical condition is a fundamental foundation in the development of an athlete's abilities, consisting of components such as strength, speed, endurance, and flexibility (Amirudin et al., 2020). Among these, speed is a crucial physical component required for sprinters. Speed is defined as an individual's ability to perform an activity within a specific unit of time. An athlete's running ability plays a vital role in supporting their success in competitions (Singh et al., 2024). A sprinter is more likely to win a race if they possess superior speed compared to their opponents. In addition, psychological conditions such as anxiety and self-confidence have a significant impact on athletic performance, including in sprint events. Therefore, in addition to physical training, mental training should also be given attention in the development programs for junior athletes (Prabowo Yudho et al., 2024).

Speed is generally classified into two main categories: general speed and acyclic speed. General speed refers to an individual's ability to respond to various motor stimuli quickly and efficiently. This ability can be enhanced through comprehensive physical training as well as targeted, specialized exercises. On the other hand, acyclic speed is associated with movement capabilities influenced by internal muscular factors, such as contraction speed and static strength. These factors are affected by muscle viscosity or tone, which determines the efficiency of muscular contractions during movement. Additionally, acyclic speed is influenced by the function of antagonistic muscles, muscle elasticity, lever length, and body mass—all of which collectively contribute to overall movement speed performance.

Theoretically, the greater the stride length, the farther the distance covered with each foot strike, which can provide an advantage in enhancing overall speed (Perry et al, 2024). In general, a longer stride can help reduce the total number of steps needed during a sprint. However, if the stride length is not accompanied by a high step frequency, the athlete may lose momentum or experience fatigue (Granatosky et al., 2022).

Sprint speed is influenced by several factors, including the frequency of leg muscle movements and the coordination of arm swings during running. In addition, explosive power during the initial push-off from the starting blocks plays a crucial role in determining overall sprint performance Based on the explanations above, it can be concluded that speed is the ability of an individual to perform body movements in the shortest possible time. Several factors influence speed, including strength, explosive power, movement coordination, and the proportion of fast-twitch muscle fibers (Yuliawan & Septriasa, 2023).

Previous studies have extensively examined the effects of various training methods on improving sprint speed in junior athletes. For instance, (Mamesah, 2018) found that step hurdle training significantly improved 60-meter sprint performance in pre-adolescent athletes. Similarly, Putra, (2021) demonstrated that pick-up sprint training and maximal effort running had a significant positive impact on 100-meter sprint speed among junior athletes. Other studies have also confirmed that both acceleration sprints and in-out sprints are effective in enhancing sprint speed, although no significant difference was found between the effectiveness of the two methods (Setiawan et al., 2021).

Based on various previous studies, numerous investigations have examined the effectiveness of specific training methods in improving sprint speed among junior athletes. However, most of these studies have been conducted in major cities or elite training centers with well-equipped facilities. To date, there is a lack of research that specifically analyzes the sprint speed performance of junior athletes in regions with limited training infrastructure, such as Banjarbaru. In fact, such studies are crucial to provide a realistic empirical overview of athlete development conditions at the regional level. This data gap is the focus of the present study, which aims to comprehensively evaluate the sprint speed profile of junior PASI athletes in Banjarbaru and identify the key factors influencing their performance.

Based on the issues described above, conducting a study on the sprint speed analysis of junior athletes under PASI Banjarbaru becomes relevant in order to determine the extent of speed capabilities among young athletes, as well as to identify the influencing factors. Therefore, the results of this study are expected to provide a comprehensive overview of the sprint speed profile of junior athletes in Banjarbaru City and serve as a foundation for designing more effective and targeted training programs in the future.

MATERIAL AND METHODS

This study employs a quantitative descriptive approach. The descriptive method is used to portray the research object or subject as it is, based on actual conditions without any manipulation (Syahrizal & Jailani, 2023). The population refers to the entire group of objects or subjects that are the focus of a study (Amin et al., 2023). The population in this study consisted of all junior sprint track and field athletes, totaling 17 individuals. The sampling technique used is total sampling, in which all members of the population are included as research subjects (Sitoyo & Sodik, 2015). Thus, the total number of samples in this study consists of 17 junior athletes.

The primary instrument used in this study was a 60-meter sprint speed test, with time measurements taken using a digital stopwatch or electronic timing device to ensure accurate data collection. Each participant performed the test twice, and the best result was used for analysis.

Table 1. Norms for the 60-Meter Sprint Test Assessment

13–15 years		Score	16-19 years	
Male	Female	(Category)	Male	Female
<6.7 seconds	<7.7 seconds	5 (Very Good)	< 7.2 seconds	< 8.4 seconds
6.8 – 7.6 seconds	7.8 – 8.7 seconds	4 (Good)	7.3 – 8.3 seconds	8.5 – 9.8 seconds
7.7 – 8.7 seconds	8.8 – 9.9 seconds	3 (Fair)	8.4 – 9.6 seconds	9.9 – 11.4 seconds
8.8 – 10.3 seconds	10.9 – 11.9 seconds	2 (Poor)	9.7 – 11.0 seconds	11.5 – 13.4 seconds
>10.4	>12.0	1 (Very Poor)	>11.1	>13.5

(Muchlisin & Pasaribu, 2020)

The sprint test results, once categorized, will then be followed by percentage calculations. The purpose of this percentage is to determine the extent of sprinting speed among junior athletes of PASI Banjarbaru. The percentage is calculated using the following formula:

$$P = \frac{f}{n} \; x \; 100\,\%$$

P: Precentage
f: Frequent
n: Total Frequent

RESULTS

The data results of sprint speed measurements for junior athletes of PASI Banjarbaru, who have completed the 60-meter sprint test, are presented in the following table:

Table 2. 60-Meter Sprint Speed Test Results

No.	Name	Gender	Age	Time (Seconds)	Category
1.	VEP	M	15 years	8,23	Fair
2.	JY	M	14 years	8,24	Fair
3.	PPMH	M	14 years	8,25	Fair
4.	EAP	M	14 years	8,34	Fair
5.	MYF	M	13 years	8,48	Fair
6.	YD	M	14 years	8,57	Fair
7.	FXP	M	13 years	8,6	Fair
8.	WL	M	13 years	8,69	Fair
9.	PP	M	13 years	8,7	Fair
10.	MBR	M	15 years	8,76	Poor
11.	MF	M	13 years	9,13	Poor
12.	MJM	M	13 years	9,19	Poor
13.	GH	M	13 years	9,84	Poor
14.	NSMN	F	13 years	10,29	Poor
15.	GLA	F	13 years	11,74	Poor
16.	DRBB	M	13 years	10,06	Very Poor
17.	DFA	F	14 years	12,66	Very Poor

Table 3. frequency table

Category	Frequency	Percentage
Fair	9	52,94%
Poor	6	35,29%
Very Poor	2	11,76%
Total	17	100%

Based on the results of the 60-meter sprint speed test conducted on 17 junior athletes of PASI Banjarbaru City, the following data were obtained, total of 9 athletes (52.94%) were categorized as Fair, 6 athletes (35.29%) were categorized as Poor. Meanwhile, 2 athletes (11.76%) were categorized as Very Poor and no athletes were classified in the Good or Very Good categories.

With the majority of athletes falling into the fair and poor categories, this indicates that, in general, the sprint speed level of junior athletes in PASI Banjarbaru City remains at a moderate to low level. The detailed frequency distribution can be seen in Table 3.

DISCUSSION

The results of this study indicate that the sprinting speed ability of junior athletes from PASI Banjarbaru City remains at a level that requires significant improvement. This is evident from the dominance of athletes falling into the "Fair" category, which is not yet sufficient for

competition at the provincial or national level. According to (Muchlisin & Pasaribu, 2020), performance within the Fair category does not reflect an athlete's maximum potential, thus necessitating improvements in both the intensity and quality of training.

Several factors contribute to the low-speed results, such as incomplete starting techniques, inefficient stride mechanics, and underdeveloped leg muscle strength. Most of the athletes are aged 13–14 years, a phase still within early motor and physiological development. In addition, more detailed technical aspects also contribute to the low sprint performance. A relatively slow start phase indicates suboptimal explosive power from the starting blocks. Some athletes appear to have incorrect body positioning at the start, resulting in poor initial momentum. Improper synchronization between arm swings and leg movements also reduces movement efficiency. In fact, coordination between arm and leg movements is crucial for maintaining rhythm and achieving maximum speed. Furthermore, relatively short stride length without a corresponding high stride frequency makes each step less effective in covering distance. The posture during running also plays an important role—body positions that are too upright or overly hunched can hinder forward propulsion.(Handayani, 2022) states that this stage is critical for establishing the foundation of physical abilities, including speed.

The absence of athletes in the "Good" and "Very Good" categories further emphasizes the low effectiveness of the current training program. Setiawan et al., 2021, underline the importance of structured exercises such as acceleration sprint drills and starting technique training in improving sprint performance. Furthermore, a more varied training approach tailored to the physical and psychological condition of adolescents is needed. Training methods such as step hurdle Mamesah (2018) and pick-up sprint Putra (2021) are examples that can be adapted to enhance sprint speed. Overall, these findings highlight the need for a systematically designed development program based on scientific principles to maximize the potential of young athletes in Banjarbaru.

When compared to previous studies such as those by (Mamesah, 2018; Putra, 2021; Setiawan et al., 2021) this research differs in focus and approach. Those studies generally investigated the effects of specific training methods on athletes from areas with adequate training facilities. For example, Mamesah demonstrated the success of step hurdle training in improving 60-meter speed, while Putra emphasized the effectiveness of pick-up sprint and high-intensity training in enhancing 100-meter sprint performance.

In contrast, the present study emphasizes a descriptive analysis of sprinting ability without implementing specific training treatments, focusing instead on athletes from a region with relatively limited training facilities. This study offers a realistic portrayal of the sprinting capability of junior athletes in an area that has previously been under-researched and rarely evaluated in depth. With findings showing that 52.94% of athletes fall into the Fair category, 35.29% into Poor, and 11.76% into Very Poor—while none reached the Good or Very Good categories—it is concluded that their sprinting speed does not yet meet competitive standards. This indicates a need to revise athlete development strategies through individualized, systematic, and scientifically grounded approaches.

Overall, this study makes a valuable contribution by providing up-to-date empirical data on the sprint speed abilities of junior athletes in a regional setting. It serves as a foundation for evaluating and redesigning training programs to optimally develop their potential.

CONCLUSION

This study reveals that the sprint speed performance of junior athletes from PASI Banjarbaru City has generally not yet reached the expected level. Most athletes demonstrated performance within the moderate to low categories, with none achieving high-performance classification. This condition indicates that their speed capacity is still insufficient to compete optimally in higher-level competitions. Overall, these findings highlight the importance of designing a more structured and sustainable training program tailored to the physical conditions and developmental stages of young athletes. The implementation of more varied and scientifically grounded training methods is believed to contribute positively to enhancing sprint speed performance, while also strengthening the athletic foundation in Banjarbaru City as a whole.

REFERENCES

Adit, A. W., & Henjilito, R. (2021). Kontibusi Daya Ledak Otot Tungkai Dan Percaya Diri Terhadap Kecepatan Lari Sprint 50 Meter. *Indonesian Journal of Physical Education and Sport Science*, *1*(2), 45–50. https://doi.org/10.52188/ijpess.v1i2.198

Amin, F. N., Garancang, S., & Abunawas, K. (2023). Konsep Umum Populasi dan Sampel dalam Penelitian. *Https://Journal.Unismuh.Ac.Id/Index.Php/Pilar/Article/View/10624/5947#*, 15–1. https://journal.unismuh.ac.id/index.php/pilar/article/view/10624/5947#

Amirudin, A., & Abdillah, S. (2020). *Analysis of Physical Conditions of Aerobic Endurance or VO2Max*.

Granatosky, M. C., & McElroy, E. J. (2022). Stride frequency or length? A phylogenetic approach to understand how animals regulate locomotor speed. *Journal of Experimental Biology*, *225*. https://doi.org/10.1242/jeb.243231

Hadisman, Mulyadi, H., & Tofikin. (2021). *Hubungan Daya Ledakotot Tungkai Terhadap Kecepatan Lari 60 Meter Siswa Kelas V Putra Sd Negeri 005 Pendalian*. https://doi.org/https://doi.org/10.56313/jsr.v1i2.67

Handayani. (2022). Analisis Gerak Keterampilan Atletik Nomor Lari Sprint 100 Meter Siswa SMP Negeri 14 Muaro Jambi. *Jurnal Pion*. https://doi.org/https://doi.org/10.22437/jp.v2i1.18405

Mamesah, E. D. (2018). Pengaruh Latihan Step Hurdle Terhadap Peningkatan Hasil Lari Sprint 60 Meter Pada Atlet Pra Remaja Putra Rawamangun Athletics Centre (Race). *Motion: Jurnal Riset Physical Education*, *6*(1), 32–44. https://doi.org/10.33558/motion.v6i1.523

Muchlisin, A., & Pasaribu, N. (2020). *TES DAN PENGUKURAN OLAHRAGA*. www.ypsimbanten.com

Mustakim, K., Studi, P., Kepelatihan, P., Fakultas, O., & Keolahragaan, I. (2019). Hubungan Panjang Tungkai Dan Berat Badan Terhadap Kecepatan Lari Sprint 60 Meter. In *Jurnal Ilmiah "Pendidikan Dasar* (Issue 1).

Perry, J., & Burnfield, J. (2024). *Gait Analysis*. CRC Press. https://doi.org/10.1201/9781003525592

Prabowo Yudho, F. H., & Aryani, M. (2024). The contribution of students' psychological conditions in achieving basketball learning outcomes. *Jurnal Maenpo : Jurnal Pendidikan Jasmani Kesehatan Dan Rekreasi*, *14*(2), 128. https://doi.org/10.35194/jm.v14i2.4967

Putra, M. R. (2021). Pengaruh Latihan Pick-Up Sprint Dan Lari Dengan Usaha Maksimal terhadap Hasil Kecepatan Lari 100 Meter Atlet Putra Atletik Club Unimed Tahun 2020 The Effect of Pick-Up Sprint and Running Exercises with Maximum Effort on the Results of the 100-meter Running Speed of Unimed Athletic Club Men's Athletes in 2020. In *JPJ (Jurnal Pendidikan Jasmani* (Vol. 2, Issue 1).

Qomara, N. R., & Susanto, I. H. (2024). *Analisis Gerak Nomor Lari Sprint 100 Meter Putra Cabang Olahraga Atletik (Studi Kasus Pada Lalu Muhammad Zohri Di Kejuaraan Dunia International Association Of Athletics Federation U-20 Tahun 2018)*. https://ejournal.unesa.ac.id/index.php/jurnal-kesehatan-olahraga/article/view/61691

Rizki, A. Z., Kusnanik, N. W., Fuad, Y., Nurhasan, N., Tuasikal, A. R. S., Al Ardha, M. A., Supriyanto, C., Tisna MS, G. D., Yang, C. B., & Lin, W. J. (2023). Kinematika Performa 100 meter Sprinter Elit Indonesia. *Jurnal Ilmu Keolahragaan Undiksha*, *10*(3), 223–230. https://doi.org/10.23887/jiku.v10i3.46305

Setiawan, W., Sanjaya, I. M. R., & Setyaningsih, P. (2021). Pengaruh Latihan Acceleration Sprints dan In-out Sprint Terhadap Kecepatan. *Physical Activity Journal*, *3*(1), 99. https://doi.org/10.20884/1.paju.2021.3.1.4701

Singh, U., Ramachandran, A. K., Baxter, B. A., & Allen, S. J. (2024). The correlation of force-velocity-power relationship of a whole-body movement with 20 m and 60 m sprint performance. *Sports Biomechanics*, *23*(10), 1526–1539. https://doi.org/10.1080/14763141.2021.1951344

Sitoyo, S., & Sodik, A. M. (2015). *Dasar Metodologi Penelitian*. https://www.researchgate.net/publication/314093441

Syahrizal, H., & Jailani, M. S. (2023). Jenis-Jenis Penelitian Dalam Penelitian Kuantitatif dan Kualitatif. *Jurnal QOSIM Jurnal Pendidikan Sosial & Humaniora*, *1*(1), 13–23. https://doi.org/10.61104/jq.v1i1.49

Yani, A., & Hasri, R. (2020). Hubungan Panjang Tungkai Dengan Kecepatan Lari 60 Meter Siswa Sekolah Dasar. *Physical Activity Journal*, *1*(2), 115. https://doi.org/10.20884/1.paju.2020.1.2.2423

Yuliawan, E., & Septriasa, I. (2023). Pengaruh Latihan SAQ Terhadap Peningkatan Kecepatan Lari 60 Meter Pada Atlet Sprinter Derako Athletics Club Jambi. *Indonesian Journal of Sport Science and Coaching*, *5*(1), 10–20. https://doi.org/10.22437/ijssc.v5i1.21361