COMPETITOR:
JURNAL PENDIDIKAN KEPELATIHAN OLAHRAGA
e-ISSN: 2657-0734 & p-ISSN: 2085-5389 ‖ Volume 17, Number 3, 2025 ‖ P.2439-2446

Analysis of The Physical Condition of South Sulawesi Pencak Silat Athletes In The Men's Category of The National Student Sports Week Sports Branch

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ABSTRACT

This study aims to analyze the physical condition of South Sulawesi men's pencak silat athletes who will participate in the National Student Sports Week (POMNAS). The study subjects amounted to 20 male athletes, who were tested through five physical components, namely speed, agility, muscle strength, leg explosiveness, and cardiovascular endurance (VO_2max). The data was analyzed using descriptive statistics to determine the minimum, maximum, mean, sum, and standard deviation (SD) values, and categorized into five levels of physical conditions: Very Poor, Less, Sufficient, Good, and Very Good. The results showed that the average physical condition of athletes was in the "Very Good" category, with some athletes (35%) in the "Very Good" category, 15% in the "Good" category, 25% in the "Sufficient" category, 20% in the "Less" category, and 5% in the "Very Less" category. The standout components are leg explosiveness and muscle strength, while speed, agility, and VO_2max still need to be improved. These findings show the inequality of physical ability between athletes and affirm the importance of a specific, structured, and needs-based physical training program to maximize athletes' performance in POMNAS matches.

ARTICLE HISTORY
Received: 2025/08/28
Accepted: 2025/09/04
Published: 2025/10/08

KEYWORDS
Physical Condition;
Pencak Silat;
Athletes;
Men's Category;
POMNAS.

AUTHORS' CONTRIBUTION
A. Conception and design of the study;
B. Acquisition of data;
C. Analysis and interpretation of data;
D. Manuscript preparation;
E. Obtaining funding

Cites this Article : Fahrizal, Fahrizal; Ilyas, Muslim Bin; Alfirizi, Muhammad Rizky. (2025). Analysis of The Physical Condition of South Sulawesi Pencak Silat Athletes In The Men's Category of The National Student Sports Week Sports Branch. **Competitor: Jurnal Pendidikan Kepelatihan Olahraga**. 17 (3), p.2439-2446

INTRODUCTION

Pencak silat is a traditional Indonesian martial sport that has undergone an extraordinary transformation into a branch of achievement in various national and international competitions. As one of the leading sports in the National Student Sports Week (POMNAS), pencak silat requires a combination of technical skills, tactical intelligence, mental readiness, and excellent physical condition (pusatprestasinasional.kemdikbud.go.id). In the context of modern sports, the aspect of physical condition is a vital foundation to support the success of techniques and strategies applied by athletes in each round of the match. The latest literature review states that the decline in the performance of pencak silat athletes in the final rounds of

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the match is strongly related to the decline in physiological abilities, especially VO_2max, muscle endurance, agility, strength, power, and quick reactions (journal.stokbinaguna.ac.id; ejournal.unesa.ac.id; eprints.uny.ac.id). A suboptimal physical condition causes athletes to be unable to maintain the intensity of attack and defence throughout the match, making them vulnerable to opponent pressure. On the other hand, athletes who have high physical capacity can maintain technical consistency and minimize the risk of injury during competition (unhas.ac.id; UNM Library).

The results of Setiawan et al.'s (2022) research show that pencak silat athletes with a high VO_2max category have a 1.7 times greater chance of winning compared to athletes who have a low VO_2max. The support of these findings is also strengthened by research conducted on PPLP athletes in West Java and South Sulawesi, which shows that the average physical condition of pencak silat athletes is still in the moderate to adequate category, so it is not considered ideal to face fierce competition at national events such as POMNAS (ResearchGate, 2023). This shows the need for the development of a periodic, measurable, and specific physical training program according to the needs of the pencak silat (jejakkontri.com) sport.

South Sulawesi, as one of the contributing provinces of national pencak silat athletes, is required to have superior and competitive physical condition readiness to compete with other provinces such as West Java, East Java, Yogyakarta, and West Sumatra. Moreover, POMNAS is not only a competition arena, but also a place for the selection and promotion of athletes to the next level of achievement, both the PON and SEA Games. Therefore, the analysis of the physical condition of South Sulawesi men's pencak silat athletes is very relevant to ensure readiness and determine which physical components are the main strengths and weaknesses before competing in POMNAS.

Based on this, this research is directed to "Analysis of the Physical Condition of South Sulawesi Men's Pencak Silat Athletes Towards the National Student Sports Week (POMNAS)". This study aims to comprehensively map the physical condition of athletes through the measurement of several basic components of physical fitness, such as cardiovascular endurance (VO_2max), muscle strength, explosiveness, agility, reaction speed, and flexibility. The results of this study are expected to be the basis for compiling recommendations for more effective, directed, and data-based physical training programs, in order to improve athletes' performance, reduce the risk of defeat due to fatigue, and support South Sulawesi's achievement targets in the POMNAS event.

METHODS

This study uses a quantitative descriptive approach with the aim of obtaining an objective picture of the physical condition of South Sulawesi men's pencak silat athletes who will participate in the POMNAS event. The subjects in this study are 20 male pencak silat athletes who are members of the South Sulawesi contingent and meet the inclusion criteria in the form of active student status and are registered as prospective participants in the men's pencak silat branch of POMNAS. Data collection was carried out

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through a series of physical condition tests that included five main components of physical fitness that are relevant to the performance demands in pencak silat, namely:

1. Speed Test, using a 40-meter sprint to measure the ability of athletes to move fast in short distances needed when attacking or dodging in the arena.
2. Agility Test uses the shuttle run Test to assess the ability to change body position quickly and precisely as part of an attack-defence manoeuvre.
3. The Strength Test is carried out through a push-up Test to evaluate the strength of the arm muscles, which play an important role in making catches, pushes, and controlling the opponent.
4. The Leg Explosiveness Test uses the Jump Test as an indicator of the ability of the leg muscles to produce explosive power in a short time when performing kick and jump techniques.
5. The Endurance Test (VO_2max) uses the Multistage Fitness Test (Bleep Test) to measure an athlete's aerobic capacity to withstand physical workloads during a match.

All tests were carried out in the indoor field of the South Sulawesi Regional Training Center (Puslatda) with controlled environmental conditions. The procedure for implementing the test follows the physical fitness measurement standards issued by the Ministry of Youth and Sports of the Republic of Indonesia and the National Physical Fitness Test. The data from the measurement of each physical component was then statistically analyzed through a descriptive approach in the form of average values, standard deviations, and categories of physical condition levels.

RESULTS AND DISCUSSION

Based on the results of a descriptive statistical analysis of the five components of the physical condition of South Sulawesi men's pencak silat athletes who will participate in POMNAS, the following picture is obtained:

Table 1.
Descriptive test of Fisk's condition

Speed	20	12.69	17.13	282.46	14.1230	1.10744
Agility	20	24.19	30.01	530.72	26.5360	1.47796
Strength	20	25.00	50.00	723.00	36.1500	6.63543
Explosive Power	20	1.95	2.70	47.40	2.3700	.21270
VO2MAX	20	27.60	50.60	770.71	38.5355	6.78742

In the speed component, a minimum value of 12.69 seconds and a maximum of 17.13 seconds were obtained, with a total score (sum) of 282.46, an average (mean) of 14.12 seconds, and a standard deviation of 1.10. This shows that athletes' speed ability is generally in the category of being quite good, although the distribution of scores (SD) shows that there are variations between individuals that are still quite visible, so that some athletes need speed improvement interventions.

The agility component showed a minimum result of 24.19 seconds and a maximum of 30.01 seconds, with a total score of 530.72, an average of 26.53 seconds, and a standard deviation of 1.48. This average shows that athletes' agility is in the medium to

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good category, but the variation between athletes is still relatively high, so improving agility training is still needed so that these abilities are more evenly distributed.

For arm muscle strength (handgrip), a minimum value of 25 kg and a maximum of 50 kg were obtained, with a total overall score of 723 kg, an average of 36.15 kg, and a standard deviation of 6.63. This value indicates that the athlete's muscle strength is in the category of sufficient, with a fairly wide distribution (high SD), so that there is a significant difference in individual physique. This means that more specific and even muscle-strengthening exercises are needed for all athletes.

The limb explosive power component (vertical jump) has a minimum value of 1.95 seconds and a maximum of 2.70 seconds, a total score of 47.40, an average of 2.37, and a standard deviation of 0.21. This value shows that the explosive ability of the athlete's limbs is in the good category, and the small standard deviation shows that the explosive ability characteristics between athletes are relatively uniform.

Meanwhile, in the cardiovascular endurance component (VO_2max), a minimum value of 27.6 ml/kg/min and a maximum of 50.6 ml/kg/min were obtained, a total score of 770.71, with an average of 38.53 ml/kg/min, and a standard deviation of 6.78. The average VO_2max is still in the sufficient category, indicating that the aerobic capacity of athletes is not ideal for intense and long-term matches. The magnitude of the standard deviation shows a relatively wide disparity in VO_2max levels between athletes, so that the endurance aspect is the component that needs the most attention and improvement in the training program.

Overall, the results of the descriptive test illustrate that the physical condition of South Sulawesi men's pencak silat athletes ahead of POMNAS is in the category of quite good, especially in arm muscle strength and leg explosiveness. However, the components of speed, agility, and especially VO_2max still need to be improved, so that the overall performance of athletes can reach the ideal category to support the achievement of achievements at the national level. These findings are an important basis for the preparation of a more specific, progressive, and targeted physical training program to support athletes' readiness for POMNAS.

Table 2.
Physical Condition Categories

Athlete	Category	Percentage
7	Very good	35%
3	Good	15%
5	Enough	25%
4	Less	20%
1	Very Less	5%

The classification of the physical condition category of South Sulawesi men's pencak silat athletes shows a diverse distribution, reflecting the level of readiness that is not entirely even ahead of participation in the POMNAS event. Based on the results of the overall assessment of the components of speed, agility, strength, explosive power, and VO_2max, it is known that as many as 7 athletes (35%) are in the "Very Good" category. This means that one-third of the total sample is already at optimal physical readiness and is expected to be able to compete in high-intensity matches. Nevertheless, only 3 athletes

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(15%) were in the "Good" category, indicating that their physical components were slightly below those of those who were categorized as very prepared. Meanwhile, 5 athletes (25%) were in the "Sufficient" category, indicating that their physical condition is at a moderate level and still needs improvement to be ready to perform optimally in the Games. What needs special attention is the existence of 4 athletes (20%) in the "Less" category, and 1 athlete (5%) in the "Very Less" category. This means that as many as 25% of the total athletes have a less-than-ideal physical condition to participate in an event as big as POMNAS. This condition shows an imbalance in the level of physical readiness between individuals, where more than half of the athletes have good to very good physical condition, while the other quarter are still in inadequate condition.

The distribution of these categories illustrates that although in general the South Sulawesi men's pencak silat team already has a fairly good physical readiness capital, there is still a need for an intensive physical training program intervention, especially for athletes who are in the category of lacking and very lacking, so that their physical ability can pursue the minimum standard of competency readiness. An individualized training program, focusing on increasing VO_2max, speed, and agility, needs to be prioritized to narrow the performance gap between athletes so that the team has consistency in physical readiness at the optimal level to face POMNAS.

Based on the results of the study, the distribution of the physical condition of South Sulawesi men's pencak silat athletes showed significant variation. Of the 20 athletes tested, 7 athletes (35%) were in the "Very Good" category, 3 athletes (15%) were in the "Good" category, 5 athletes (25%) were in the "Sufficient" category, 4 athletes (20%) were in the "Less" category, and 1 athlete (5%) was in the "Very Poor" category.

Speed

Speed is an important component in pencak silat, especially in effective attacks and defense. Athletes who are in the "Very Good" category show fast reaction times, allowing them to anticipate and respond to opponents' movements efficiently. This is in line with the finding that speed is the main motor ability that determines an athlete's high-performance profile.

Agility

Agility allows athletes to move quickly and change direction with precision, which is crucial in dodging attacks and performing counterattack techniques. Athletes in the "Very Good" category show high agility, allowing them to effectively master the movement space. Research shows that agility is one of the key motor abilities that determines an athlete's high-performance profile.

Strength

Muscle strength, especially in the lower extremities, is essential in pencak silat to produce powerful kicks and body stability while defending. Athletes in the "Very Good" category show optimal muscle strength, allowing them to perform techniques at maximum strength. Research emphasizes that muscle strength is an important component of physical fitness that affects athletes' performance.

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Explosive Power (Leg Power)

The explosive power of the legs allows athletes to perform explosive kicks and high jumps. Athletes in the "Very Good" category show high limb explosiveness, allowing them to perform high-intensity techniques. Research shows that leg explosiveness is an important component in physical fitness that affects athletes' performance.

VO_2max (Cardiovascular Endurance)

VO_2max is an indicator of aerobic capacity that is important in maintaining performance during matches. Athletes in the "Very Good" category show a high VO_2max, allowing them to maintain high intensity throughout the game. Research shows that VO_2max is an important component of physical fitness that affects athletes' performance.

Athletes who fall into the "Less" and "Very Less" categories show significant weakness in one or more physical components. This can affect their performance in matches, especially in the face of stronger opponents. Research shows that muscle strength is an important component of physical fitness that affects athletes' performance.

CONCLUSION

The results of the study show that the physical condition of South Sulawesi men's pencak silat athletes is generally in the category of sufficient to good, with some athletes managing to reach the "Very Good" category. This indicates that the team as a whole has adequate physical capital to face the competition, although it is not evenly distributed among all individuals. Of the five physical components tested, leg explosiveness and muscle strength were prominent aspects, indicating that athletes have explosive abilities and strength that support kicking techniques and body stability when competing. Meanwhile, speed, agility, and VO_2max still show significant improvement needs. These components are essential to maintain the athlete's performance throughout the match, especially against stronger opponents or in the final round of the match.

In addition, as many as 25% of athletes are in the Less to Very Less category, indicating an imbalance in physical abilities between individuals. This condition underscores the importance of an individual and specific training approach, so that all athletes can achieve a more balanced and optimal physical readiness. The findings of this study provide a strong scientific basis for trainers and related parties to develop a more targeted, progressive, and needs-based physical exercise program. By focusing on improving the physical components that are still weak, the training program is expected to improve the overall performance of athletes and maximize the chances of success of the South Sulawesi team at the POMNAS event.

ACKNOWLEDGMENT

The author would like to express his gratitude to all parties who have assisted in the implementation of the research "Analysis of the Physical Condition of South Sulawesi Pencak Silat Athletes in the Men's Category at the National Student Sports Week

(POMNAS) Sports Branch." Special thanks are extended to the South Sulawesi pencak silat athletes who have participated, the coaches and administrators who provided support, and the families and colleagues who have continuously prayed for and motivated them. Hopefully, the results of this research will be beneficial for the development of pencak silat and improve the athletes' achievements in the future.

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