14 (3) (2025) 1071 - 1076
Journal of Physical Education, Sport, Health and Recreations
https://journal.unnes.ac.id/journals/peshr

Analysis of the Test Results of the Physical Condition Ability of Karate Athletes in West Java

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Article History

Received October 2025
Accepted October 2025
Published Vol.14 No.(3) 2025

Keywords:
Karate Athletes ;
Physical Condition;
Physical Condition Test

Abstract

Physical condition is one of the requirements needed in the effort to improve athletes' performance, and it can even be considered a basic necessity that cannot be postponed or negotiated. An athlete's physical condition is very important to achieve maximum performance. This study aims to analyze the general physical condition of karate athletes from West Java. The method of this research is a quantitative descriptive study with a typical descriptive design. The population in this study consists of 20 karate athletes from West Java aged 17-21 years. The sampling technique used is total sampling. The data collection technique uses a test instrument, which consists of 9 test items, namely the Sit and Reach Test, 20 M Sprint, Side Step Test, Medicine Ball Test, Vertical Jump Test, Push Up Test, Sit Up Test, Back Up Test, and Bleep Test. The data results using descriptive analysis with percentages based on categorization norms. The research shows that the physical condition of West Java karate athletes overall falls into the medium category, which is 81%, thus it can be concluded that the physical condition of West Java karate athletes is moderate. This research can serve as a guideline in evaluating the effectiveness of the training programs that have been implemented, allowing trainers to make improvements or adjustments to training programs in a more targeted manner.

How to Cite

Julianty, R., Sagitarius., & Novian, G. (2025). Analysis of the Test Results of the Physical Condition Ability of Karate Athletes in West Java. Journal of Physical Education, Sport, Health and Recreation, 14 (3), 1071-1076.

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p-ISSN 2460-724X
e-ISSN 2252-6773

INTRODUCTION

Karate is one of the branches of martial arts that requires high physical abilities to achieve optimal performance. Components of physical condition such as speed, muscle strength, muscle explosiveness, agility, flexibility, and endurance are determining factors for athletes' success in facing various attack and defense techniques (Rajagukguk & Putra, 2022).

Better physical condition has many advantages, including athletes being able and easily learning relatively difficult new skills, not getting tired quickly during training and competitions, training programs can be completed without many obstacles, recovery time is faster, and they can complete relatively heavy workouts. in addition, physical training greatly impacts the increase in athletes' self-confidence and reduces the risk of injury (Andibowo et al., 2022).

Physical condition is a component that determines an athlete's ability to achieve optimal performance. In the sport of karate, physical qualities such as strength, speed, explosiveness, endurance, agility, and flexibility are the main prerequisites to support techniques, strategies, and stamina during competitions (Prasetya Adi, 2024) Physical condition is a holistic unity of various components that cannot be separated, both in its development and maintenance, so improvements in physical condition must be carried out comprehensively and sustainably.

Tudor O, Bompa & Carlo A, (2019) Physical condition is an integral whole of components that cannot be simply separated, both in improvement and maintenance. This means that in the effort to improve physical condition, all of these components must be developed. Physical condition is a requirement that must be possessed by an athlete in order to enhance and develop optimal sporting performance, so that all aspects of their physical condition must be developed and improved according to the characteristics, traits, and needs of each sport.

(Hidayat & Asnaldi, 2022) It is said that karate is a branch of sports that is performed in the form of movement activities using hands and feet such as punches, blocks, and kicks. Karate can develop movement skills, attitude, mental, and physical abilities. Karate itself has basic techniques that are often used for training, called kihon, kata, and kumite. Kata is the fundamental movement of karate that is refined into a beautiful art form. Kumite is fighting and scoring points quickly, and kumite teaches how to attack and defend when facing an opponent (Susilo & Wiriawan, 2021)

The reason why this issue needs to be researched is that the physical condition component tests are very important and necessary for athlete performance. Physical condition is an essential component that cannot be ignored and eliminated as initial data to create a training program. Good physical condition will facilitate athletes in displaying good techniques and tactics during competitions. Every karate athlete must have optimal physical condition to achieve optimal performance. To obtain optimal physical condition, one must go through the right and well-programmed training process (Yamaska et al., 2023).

This research is based on the need to obtain an objective picture of the physical condition of karate athletes in West Java through a series of tests tailored to the characteristics of this sport. This condition indicates that efforts to improve athlete performance cannot solely focus on technique and tactics but must also be supported by an adequate evaluation of physical condition. Previous research still used general measurement instruments, not specific to karate, making the results less optimal as a basis for developing an effective training program (Akbar & Boihaqi, 2022)

In the world of sports, everyone who pursues and dedicates themselves to a particular sport is usually assumed to have a body in good physical condition, because without this, athletes will face difficulties in carrying out the sports they practice and engage in. In the martial art of karate, athletes are required to possess good physical abilities, as good physical condition will shape components such as technique, tactics, and mental strength. An athlete must also be able to maintain and manage their physical condition so that the energy expended during training and competition can be effective and efficient, thus preventing easy fatigue and enabling them to perform movements accurately (Kadir et al., 2022).

The novelty of this study lies in its use of a physical condition test battery specifically designed and adapted for karate athletes, which considers the unique characteristics and movement patterns of karate such as kihon, kata, and kumite. Previous studies generally used general fitness tests that did not accurately reflect the physiological and biomechanical demands of karate. Therefore, this research provides a more precise and sport-specific evaluation framework, which can contribute to the development of more effective training programs and enhance athlete performance in karate.

METHODS

The type of research used is of a Descriptive Quantitative nature, which aims to reveal something as it is. Quantitative research is structured research that quantifies data to be generalized. Descriptive research is research that seeks to describe phenomena that occur in a real, realistic, actual, and present manner, as this research provides a systematic, factual, and accurate description, depiction, or illustration of facts, characteristics, and relationships between the phenomena being investigated (Irwansyah et al., 2022) .

(Ruhansih, 2017) The research method is descriptive quantitative, which is a type of research characterized by being systematic, planned, and structured with an initial trace leading to the design of the research. This study uses the descriptive quantitative research method where data is obtained from numbers and then described according to the realities obtained in the field.

This research design uses a typical descriptive design which is aimed at seeking accurate information about the characteristics of a sample group (which can be subjects, groups, institutions, or situations). The researcher only seeks information related to the frequency of an event or phenomenon, and only identifies, conceptualizes, and defines the operational definitions of variables that are considered important (Adnyana, 2021).

(Assayakurrohim et al., 2023) In this study, the population refers to all karate athletes from West Java who have met the criteria to participate in physical condition ability tests. The selected population consists of 20 athletes. The decision to make these 20 athletes the population is based on several considerations. These athletes are part of a team that actively participates in training and competitions, making their physical condition relevant for research.

Research instruments are a crucial component in research as they function to collect data relevant to the research objectives. (Mustofa & Sahri, 2022) This process is part of the effort to ensure that the data collected can accurately answer the research questions, allowing the hypotheses to be tested objectively. The benchmark for each physical test item can be seen in the **Table 1.**

Table 1. Benchmark

Physical Test Item	Male (L)	Female (P)
Sit and Reach Test	26 cm	29 cm
20-Meter Sprint	3 s	3.2 s
Side Step Test	25	23
Medicine Ball Throw	5 m	4 m
Vertical Jump	75 cm	69 cm
Back Ups	70	60
Push Ups	60	50
Sit Ups	55	50
Bleep Test	55	50

After the data is collected, data analysis is then carried out, which is the process of searching for and organizing data from the observations. Various data and information obtained in the field are then analyzed using descriptive analysis techniques through several stages, namely data reduction, data display, drawing conclusions, and verification. This is done to find information about physical demands. The Standard Percentage value can be seen in the **Tabel 2.**

Tabel 2. Physical Fitness Test Assessment Categories (Gultom et al., 2019)

Percentage (%)	Category
0 – 20	Very Poor
21 – 40	Poor
41 – 60	Fair
61 – 80	Good
81 – 100	Excellent

RESULTS AND DISCUSSION

Physical condition is a very important component in elite sports. In the effort to improve physical condition, all components of physical condition must also be developed, although this is done with varying priorities according to the needs of each component (Larasati et al., 2024).

All the information obtained by researchers through their research can be presented and explained in this regard. West Java karate athletes underwent physical condition tests directly (Afiah et al., 2023). The results of the statistical description can be seen in the **Table 3.**

Table 3. Description of table

Component	Test Item	N	Min	Max	Total	Mean	Std. Deviation
Flexibility	Sit and Reach Test	20	12	34	485	24,25	5,1563068
Speed	20-Meter Sprint Test	20	2,95	3,97	68,17	3,4085	0,2779618
	Side Step Test	20	10	36	518	25,9	5,5668663
Strength	Medicine Ball Test	20	1,69	3,2	41,18	2,059	0,2823101
	Vertical Jump Test	20	30	65	966	48,3	10,550355
	Push-Up Test	20	24	80	987	49,35	15,405437

	Sit-Up Test	20	35	66	998	49,9	8,2091413
	Back-Up Test	20	30	90	1423	71,15	14,970888
Endurance	Bleep Test	20	39	133	1316	65,8	25,728583
Daya Tahan	Bleep Tes	20	28,4	51,5	774,2	38,71	6,7418024

Based on the results **Table 3**, there are 9 tests to obtain the physical condition results of West Java karate athletes. The 9 tests are Flexibility Test with Sit and Reach, speed test with a 20-meter sprint, agility speed test with side step test, hand muscle strength test with a medicine ball, leg muscle strength test with vertical jump, arm muscle endurance test with push-ups, abdominal muscle endurance test with sit-ups, back muscle strength test with back-ups, power endurance test with hurdle jump test, and vo_2max test using the beep test. The total results from the physical condition tests of 20 karate athletes from West Java are as follows: 485 cm for the sit and reach test, 68.17 seconds for the 20-meter sprint test, 508 repetitions for the side step test, 41.18 meters for the medicine ball test, 966 cm for the vertical jump test, 987 repetitions for the push-up test, 998 repetitions for the sit-up test, 1423 repetitions for the back-up test, and 741.2 ml/kg/min for the beep test (Danila & Rizanul, 2022).

The results of the physical condition description of karate athletes in table 3 above show that the main physical components including flexibility, speed, strength, and endurance have a variation of values that reflect the characteristics of physical needs in the sport of karate.(Baizar Ummayum, Umar, Alnedral, Yogi SetiawanStudi et al., 2023)

Flexibility with an average score of 24.25 cm from the Sit and Reach Test and a standard deviation of 5.15 indicates that the athletes' flexibility is in the moderate category. Flexibility is one of the important components in karate as it supports the ability to perform high kicks and hip rotation with optimal range of motion. According to studies (Gaweł et al., 2025), good flexibility can enhance the efficiency of kicking techniques and reduce the risk of muscle and joint injuries. Other research also shows that flexibility correlates with the performance of effective mawashi geri and yoko geri techniques in competitions. Thus, dynamic and static stretching exercises are highly recommended in the training programs for karate athletes.

The speed of athletes is assessed through the 20 Meter Sprint and Side Step Test, with an average time of 3.41 seconds (SD = 0.27) for the 20 Meter Sprint, indicating a good and consistent sprinting acceleration capability among the athletes. Speed in karate plays a crucial role as it serves as the foundation for executing effective attacks while also evading opponents' attacks. The ability to evade and perform counterattacks is also significantly influenced by foot movement speed and directional changes (Nopriansyah, 2020). This demonstrates that speed is not only related to leg muscle strength but also to coordination, reaction, and the ability to process visual information during a match. Therefore, developing speed through specific training such as SAQ, sprint intervals, and change of direction training is essential to support optimal performance in karate competitions (Ladia Apsari Hasibuan et al., 2025).

The muscle strength of athletes is evaluated through several test items including the Medicine Ball Test, Vertical Jump Test, Push Up Test, Sit Up Test, and Back Up Test. The measurement results show an average Medicine Ball throw distance of 2.06 meters, a Vertical Jump height of 48.3 cm, an average of 49.35 Push Up repetitions, 49.9 Sit Up repetitions, and 71.15 Back Up repetitions. These findings indicate that athletes have good upper body, core, and leg muscle strength. (Sa'diah et al., 2024) This muscle strength is a crucial foundation in the sport of karate, considering that every attack and defense technique such as punches, kicks, as well as the ability to defend requires optimal muscle strength contribution to generate explosiveness, stability, and overall effectiveness of movement.(Martinez-De-Quel et al., 2021) It reveals that muscle strength directly contributes to effective punching and kicking in karate.

The aerobic endurance in this study was measured using the Bleep Test and obtained an average score of 38.71 (SD = 6.74), indicating that the aerobic capacity of the athletes is in the quite good category. (Andibowo et al., 2022) Adequate aerobic capacity plays a very important role in karate, considering that matches usually last for several rounds with high intensity, requiring the body's ability to continuously produce energy without experiencing a significant drop in performance. Aerobic endurance allows athletes to maintain movement speed, punching power, and technique accuracy throughout the duration of the match, as well as helps to speed up recovery between rounds. (Asy'ar et al., 2022) According to this, high aerobic capacity is very important in martial arts to reduce fatigue and maintain technical quality during competitions.

The results of this physical condition profile show that although the athletes already have good strength and speed, improvements are still needed in flexibility and aerobic endurance as-

pects to support optimal performance. By utilizing the results of this evaluation, coaches can design a more specific training program, such as integrating SAQ training, plyometrics, core strength training, as well as structured stretching and HIIT workouts (Widhiantoro et al., 2024).

Training programs can be designed collectively while maintaining uniform training intensity, such as flexibility training through dynamic stretching, abdominal muscle strength with core stability training, and leg muscle explosiveness with plyometric training. Conversely, for variables that show high diversity, an individualized approach is necessary, for example, by providing additional training portions for agility through agility ladder drills and increasing aerobic endurance through high-intensity interval training (HIIT). (Wijianto, 2024) The application of training based on individual needs can significantly enhance athletes' physical abilities while reducing performance gaps within the team.

CONCLUSION

Overall, the physical condition profile of West Java karate athletes shows a promising yet balanced pattern: the flexibility and endurance of the athletes are at an optimal level, while speed is categorized as good; conversely, muscle strength capacity is uneven and requires specific interventions. The good condition of flexibility allows for the range of motion in the legs and hips necessary for kick variations and technical control, as well as helping to reduce the risk of injury when performing extreme movements. Evidence supports that structured mobility and flexibility programs can maintain or improve good technique (Juniar & Wijono, 2019).

Optimal cardiovascular endurance in this sample is an important modal to maintain the intensity of kumite and kata matches during competitions. high-intensity interval training (hiit) approaches and competition-specific interval training have been proven effective in increasing vo_2max and anaerobic-aerobic capacity in karate athletes, and are thus recommended to be maintained in the competition preparation program (cid-calfucura et al., 2023).

The aspects of flexibility and endurance are in optimal condition, indicating that the athlete has good body adaptation abilities as well as heart and lung work capacity to support high-intensity activities. Speed is also in a good category, thus supporting effectiveness in launching attacks as well as anticipating the opponent's attacks. However, the aspect of strength still requires more attention, as muscle strength is the main foundation for generating explosiveness, stability, and the ability to maintain body posture when facing physical contact (hambali et al., 2020).

(usman & argantos, 2020) the disparity in this strength aspect indicates the need for more specific training interventions, such as through resistance training programs, plyometrics, and continuous core strengthening. These findings are important as a basis for evaluation to design a more targeted training program, individualized according to the athlete's needs, and systematically periodized, so that all components of physical condition can develop in balance. Thus, the training conducted not only enhances short-term performance but also contributes to achieving peak performance in various national and international competitions.

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