



Physical Profiling of Taekwondo Athletes at the Cirebon District Training Center

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Abstract

Physical condition is the main foundation that determines the quality of athletes' performance in taekwondo. The characteristics of the competition, which require explosive movements, high speed, and the ability to maintain intensity, make aerobic endurance, speed, and muscle strength crucial physical components. This study aims to determine and describe the physical condition profile of taekwondo athletes from the Cirebon District Training Center. The research method used is quantitative descriptive with a cross-sectional approach. The research sample consisted of 11 athletes (5 females and 6 males) aged 15–20 years who were selected using total sampling technique. Data were obtained from physical condition tests, including a 20-meter sprint, 200-meter sprint, 1-minute sit-ups, 1-minute push-ups, 1-minute back-ups, and the Balke Test to estimate $\dot{V}O_{2\text{Max}}$. Data analysis was performed using descriptive statistics in the form of mean values, standard deviations, minimum values, and maximum values. The results showed that, in general, the athletes' physical condition was in the adequate category. However, when assessed based on the norms, most athletes were still in the poor to very poor category. There were clear variations in ability among athletes in each component of physical condition. These findings indicate a gap between the actual physical condition of athletes and the performance standards required in taekwondo. Therefore, a more focused, structured, and sustainable physical training program is needed so that improvements in athletes' physical condition can be more evenly distributed and optimal.

How to Cite

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INTRODUCTION

Physical condition is one of the main aspects that determine an athlete's performance in achieving optimal results. In taekwondo, physical condition plays a very important role because competition requires speed, strength, endurance, agility, and flexibility simultaneously. Taekwondo itself is a Korean martial art that has developed into a modern sport with a primary focus on fast kicking techniques, balance control, and body movement efficiency. Competition rules require athletes to remain aggressive, maintain their attack rhythm, and be able to respond quickly to situations. Taekwondo relies not only on strength, but also on movement coordination, timing, and the ability to manage energy during the dynamic duration of a match. Recent research indicates that the explosive and repetitive nature of Taekwondo movements demands high physical readiness to enable athletes to maintain performance without compromising technical quality (Khazaei et al., 2023). Therefore, the combination of speed, strength, and endurance makes physical condition an important prerequisite for techniques and tactics to be executed optimally in competitive situations (Apollaro et al., 2024; Ojeda-Aravena et al., 2021).

In the context of competitive sports, physical condition plays a fundamental role in enabling athletes to perform their movements efficiently. Physical condition encompasses various components such as cardiovascular endurance, muscle strength, speed, agility, power, and flexibility. These components work together to ensure that athletes' bodies are ready to face the demands of training and competition. Research over the past five years shows that athletes with good physical condition have more stable kicking quality, faster reaction times, and a lower risk of injury (Rahman & Fikri, 2024). In sports such as taekwondo, where the intensity of movement tends to be high, inadequate physical condition can cause fatigue, decreased attack accuracy, and even failure to maintain strategy when the match enters the final round. Therefore, strengthening physical condition is not only a supporting need but has become an integral part of the overall athlete development process (Rahman & Fikri, 2024).

Training at the Cirebon District Taekwondo Training Center is conducted intensively, with three training sessions per day. Based on interviews with athletes, the training program implemented is quite intense and has a positive impact on performance improvement, especially in terms of

speed and physical endurance such as $VO_2\text{Max}$. The athletes also said that they rarely experience excessive fatigue or injury during training, which indicates that the program design is quite effective and suits their physical needs. This is reflected in the achievements that have been made, for example at the Merdeka Championship, where they won 10 gold and 1 silver medals and became the overall champion. At the Regional Student Sport Week (POPDA) event, even though there were only six athletes, they still managed to bring home one bronze medal. Furthermore, at the Kajari Cup Championship, the Cirebon team again showed good performance by winning 11 gold medals and placing third overall. The variety of achievements shows great potential, but in-depth evaluation is still needed to ensure that the athletes' physical condition is at a consistent level and in accordance with competition standards (Rosmaniar, 2022).

Physical profiling is an important aspect of athlete development because it provides an objective picture of an athlete's physical abilities. Through profiling, coaches can determine whether physical components such as speed, agility, endurance, and strength meet standards or need improvement. Physical profiles also help coaches tailor training programs to be more targeted, especially in minimizing the risk of injury while improving technical and tactical performance. Technique in taekwondo includes how athletes execute movements efficiently from kicking accuracy, hip rotation coordination, body balance, posture control, to the quality of attack combinations. Meanwhile, tactics relate to how athletes read the match situation, determine the momentum of attacks, manage distance, understand their opponents' patterns, and adjust the rhythm of their attacks and defense. In taekwondo, components such as kicking speed, leg muscle strength, and the ability to maintain intensity are important factors in determining the quality of competition. Research (Ahmad & Lestari, 2022; Putra & Sari, 2023) emphasizes that athletes with good physical profiles tend to have more stable competitive performance, more mature strategies, and better adaptability in high-intensity matches. Physical profiles are also frequently used in athlete selection processes, training periodization planning, and periodic performance evaluation (Putra & Sari, 2023).

To date, there has been no scientific data documenting the physical condition profile of taekwondo athletes in the Cirebon District Pelatcab. In fact, this data is very important for determining the actual physical abilities of athletes

and whether they are in line with provincial and national standards. The lack of data means that training evaluations are based more on subjective assessments and the experience of coaches, without any standard benchmarks to use as a reference. Therefore, compiling a physical condition profile is highly relevant to provide a scientific basis for the training process, improving training programs, and mapping athletes' potential. Based on this background, this study aims to determine the physical condition profile () of taekwondo athletes in the Cirebon District Pelatcab. The results of this study are expected to not only provide a comprehensive picture of the athletes' physical fitness levels, but also serve as important evaluation material for coaches in developing future training programs so that athletes' performance can be optimized in various competitions, both at the provincial and national levels (Nugraha, 2020).

METHOD

This study uses a quantitative descriptive (cross-sectional) approach to describe the physical condition of athletes at a specific point in time. The cross-sectional approach was chosen because the purpose of the study was to map physical profiles based on available measurements without conducting interventions or repeat measurements. This approach is suitable for profiling studies and is widely used in athlete fitness research (Putra & Sari, 2023).

The study population consisted of all athletes registered with the Cirebon District Taekwondo Training Center. The sample analyzed consisted of 11 athletes (5 females, 6 males) aged 15–20 years who were actively training and participating in routine tests in June 2025. Due to the relatively small number of athletes, the sampling technique used was total sampling, so that all athletes who met the inclusion criteria were included in the analysis.

The instruments used in this study involved a series of physical condition tests using testing and measurement techniques, namely:

1. 20 m, 200 m sprint: measures speed, acceleration, and speed endurance at various distances relevant to the movement demands of taekwondo (Rahman & Fikri, 2024). Travel time is recorded using timing devices available in the coach's documentation.
2. Sit-ups (1 minute): measures abdominal muscle endurance as an indicator of core strength. The protocol follows standard physical fitness measurement guidelines (Prof, n.d.).
3. Push-ups (1 minute): measured chest, arm, and shoulder muscle endurance. The implementation followed the full repetition standard standardized by the coach evaluation team.
4. Back-up (1 minute): measures the strength and endurance of the lower back (lumbar) muscles that support postural stability during technique execution.
5. Balke Test (15-minute continuous run): used to measure cardiorespiratory endurance. Data recorded includes number of laps, remaining laps, and total distance (meters); this total distance is converted to an estimated VO_2 Max. The Balke Test was chosen because it can provide an estimate of aerobic capacity in the field without laboratory equipment (Rahman & Fikri, 2024).

All test instruments were selected because they are relevant to the physical characteristics of taekwondo and are commonly used in athlete fitness evaluations (Datau et al., 2024; Survey Of Endurance Levels, n.d.).

The data processing procedure began with the researcher and coach verifying the completeness of the test results documents, normalizing the data format into a spreadsheet (Excel), and then importing it into SPSS version 25 for analysis. The data source was secondary data from physical tests conducted by the Pelatcab coaching team in June 2025 as part of a pre-competition evaluation Provincial Sport Week Preparation Program (BK PORPROV). The researcher was not directly involved in conducting the tests in the field; therefore, all data was obtained through the trainers' official documentation and verified for completeness before analysis. The use of this secondary data was chosen because during the data collection period, the athletes were undergoing intensive preparation and try-outs, making retesting impossible.

In terms of research ethics, researchers obtained written permission from Pelatcab administrators before accessing data, maintained the confidentiality of individual data by presenting results only in aggregate form unless there was written permission for names, and noted any limitations of the data sources (e.g., variations in measurement tools, weather conditions, or different recorders). The main limitation of this study is the use of secondary data, which limits the researcher's control over field procedures; therefore, the discussion section of the study will

include notes on the validity of the records and recommendations for direct measurement in further studies (Nugraha, 2020).

Data analysis uses descriptive statistic, including calculations of mean, standard deviation, minimum, and maximum values for each component of the physical test. This approach is commonly used in Taekwondo athlete profiling research. Through this technique, a clear picture of the distribution of values and the level of athletes' abilities in each physical indicator is obtained.

The data obtained was then analyzed using simple statistical software. The results of the calculations were then interpreted and compared in general with the findings of previous studies to see the performance position of Pelatcab athletes in the context of martial arts studied.

RESULTS AND DISCUSSION

This study presents the physical condition profile of taekwondo athletes from the Cirebon District Pelatcab based on aerobic endurance, speed, and muscle strength components. The presentation of results focuses on descriptive statistics, individual athlete profiles, and physical condition classification based on norms.

A show in **Table 1**, based on the results of measuring the athletes' physical condition, descriptive statistical data was obtained, including the mean, standard deviation, minimum, and maximum values for each component. The 20-meter sprint test results showed a mean value of 4.09 seconds, while the 200-meter sprint test produced a mean value of 35.97 seconds. In the muscle strength component, the average value for 1-minute sit-ups was 46.64 repetitions, 1-minute push-ups was 36.73 repetitions, and 1-minute back-ups was 85.09 repetitions. Aerobic endurance estimated through the Balke Test showed an average VO₂Max value of 42.00 ml/kg/minute.

Table 1. Descriptive Statistics of Physical Condition Components of Taekwondo Athletes of the Cirebon District Training Center in 2025

Test Item	Mean	SD	Min	Max
20 M Sprint	4.09	0.47	3.18	4.78
200 M sprint	35.97	4.51	3.18	43.95
Sit Up	46.64	11.49	22	57
Push Up	36.73	10.53	23	60
Back Up	85.09	11.96	68	105
Vo2 Max	42.00	4.20	36.22	48.72

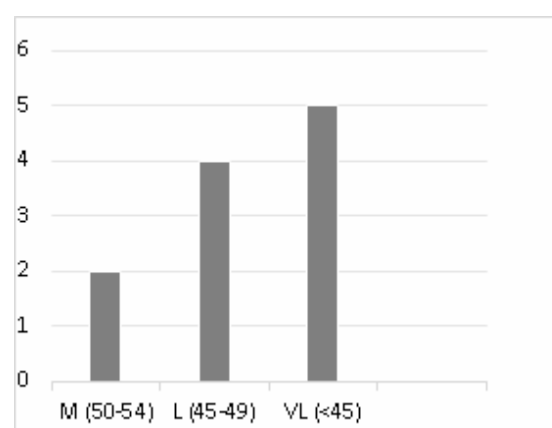
The results of physical condition, a show in **Table 2**, profiles show variations in achieve-

ment in each physical component. No athlete showed consistent excellence in all physical condition components. Some athletes had relatively better aerobic endurance scores, but showed limitations in speed or muscle strength components. Conversely, there were athletes with good speed abilities but without adequate aerobic endurance to match.

Table 2. Physical Profile of Taekwondo Athletes from the Cirebon District Training Center

Name	20 M Sprint	200 M sprint	Sit Up	Push Up	Back Up	Vo2Max
APR	4.3	39.34	47	60	87	37.37
RYS	3.92	32.78	54	41	90	41.04
FTH	4.63	41.1	22	25	75	37.71
AZA	3.76	34.29	56	48	88	36.22
NRL	4.45	43.95	28	23	81	39.77
TRH	3.18	27.75	47	40	68	48.72
FZN	4.34	34.52	45	38	68	48.72
MFD	4.11	35.87	54	32	105	44.02
WRY	4.78	40.8	54	31	102	42.76
ADW	3.9	35.85	57	33	88	42.41
RYF	3.65	34.57	49	33	84	43.79

As show in **Graph 1**, based on the classification of athletes' physical condition norms, the majority of athletes are in the poor to very poor category. A small number of athletes are in the moderate category, and there are no athletes in the good or very good category overall. This distribution of categories shows that the physical condition of Pelatcab Cirebon District athletes has not developed optimally and still needs improvement in various physical components.



Graph 1. Distribution of Athletes Based on Physical Condition Categories (M = Medium; L = Low; VL = Very Low).

The results show that although the average physical condition of athletes is in the adequate category, distribution based on norms shows

that most athletes are still in the poor to very poor category. These findings indicate a gap between the average achievement and the expected fitness standards for competitive taekwondo athletes.

In terms of aerobic endurance, the average VO₂Max value, which is at a moderate level, indicates that the athletes' cardiorespiratory capacity does not yet fully support the demands of intense and repetitive taekwondo competition. This condition is in line with findings (Datau et al., 2024; Endurance Level Survey, n.d.) reporting that regional-level taekwondo athletes generally have suboptimal aerobic capacity. Low aerobic capacity has the potential to cause a decrease in attack effectiveness and reaction speed in the final phase of the competition (Agafian Dhuha et al., 2023).

In terms of speed, variations in the results of the 20-meter and 200-meter sprints indicate that the athletes' speed abilities have not developed evenly. Speed is an important component in taekwondo because it is directly related to attacking and defending abilities. This imbalance in speed ability is in line with the findings (Meisya et al., n.d.; Rahman & Fikri, 2024) which state that non-elite taekwondo athletes often show significant differences in speed ability.

In terms of muscle strength, the results of sit-up, push-up, and back-up tests show that the core and upper extremity muscle strength of athletes still varies. Suboptimal muscle strength can affect body stability, kicking technique effectiveness, and increase the risk of injury. This is in line with findings (Zhu et al., 2025) and research on the muscle strength profile of elite taekwondo athletes which emphasizes the importance of muscle strength balance in supporting performance (Lee et al., 2024).

Overall, the dominance of the poor to very poor categories in the physical condition classification indicates that physical training still requires systematic improvement. These findings are consistent with the results of previous studies (Arni & Indrayana, 2021; Meisya et al., n.d.). In addition, the quality of training, consistency of practice, and physical readiness have been proven to influence the achievements of taekwondo athletes at the regional level (Agafian Dhuha et al., n.d.). Therefore, periodic evaluation of physical condition through a physical profiling approach is important as a basis for planning a more focused training program that is in line with the demands of modern taekwondo.

CONCLUSION

Based on the results of the study, it can be

concluded that the physical condition profile of taekwondo athletes at the Cirebon District Pelatcab is generally at a sufficient level based on descriptive statistical averages. However, the majority of athletes are still in the poor to very poor category based on the classification of physical condition norms, particularly in the components of aerobic endurance, speed, and muscle strength.

It is recommended that coaches develop a more structured physical training program with an emphasis on improving aerobic endurance, speed, and muscle strength through interval training, plyometrics, and taekwondo-specific strength training. Physical condition evaluations should also be conducted regularly so that athletes' progress can be monitored objectively. Further research is recommended using a larger sample size and a longitudinal design to obtain a more comprehensive picture of athletes' physical condition development.

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