

Physical condition profile of prospective athletes for the Banten Province student sports education and training center: taekwondo

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Abstract

This study aims to determine the physical condition profiles of prospective taekwondo athletes at the Banten Province Student Sports Education and Training Center (PPLOP) in 2022 and to serve as a basis for athlete selection. The study employed a quantitative descriptive method using a survey approach. The study population and sample consisted of 10 prospective taekwondo athletes participating in the selection process, comprising 5 male athletes and 5 female athletes. The instruments used included physical fitness tests covering speed (30-meter sprint), agility (shuttle run), strength (push-ups and sit-ups), power (standing broad jump and vertical jump), flexibility (sit and reach), coordination (tennis ball throw and catch), and endurance (multistage fitness test). Data were analyzed using descriptive statistics in the form of percentages. The results showed that male athletes' speed fell into the "adequate" category, while female athletes' speed was in the "good" category. Agility for both male and female athletes was in the "poor" category. Strength components ranged from "good" to "very good" in both groups. Lower-body explosive power, as measured by the standing broad jump, was in the "poor" to "very poor" categories, while the vertical jump was in the "adequate" category. The flexibility of both male and female athletes is rated as very good. The coordination of both groups is rated as very poor. Meanwhile, the cardiovascular endurance of both male and female athletes is rated as good. Overall, strength, flexibility, and endurance are the most prominent components, while coordination, agility, and explosive power still need improvement.

Keywords: Physical Condition; PPLOP Athletes; Taekwondo; Banten Province.

INTRODUCTION

In today's modern world, people cannot be separated from sports, as sports consist of a series of systematic physical activities that utilize the body to perform various motor skills. The motor skills developed through sports can encourage and foster an individual's achievements. Moreover, sports also have the potential to shape an individual's mental, spiritual, and social development. As explained in Law of the Republic of Indonesia No. 3 of 2005 on the National Sports System, Article 1, Point 4, which states: "Sports are all systematic activities aimed at encouraging, fostering, and developing physical, spiritual, and social potential" (Edi Azwar, 2021: 135). Additionally, the law specifies three types of sports: educational sports, recreational sports, and competitive sports. Educational sports are conducted within the formal education system as a means for students to engage in physical activity. Recreational sports are practiced during leisure time, can be done anywhere, and involve an element of enjoyment. Competitive sports are conducted to systematically, planned, and comprehensively nurture and develop an individual through competition to achieve excellence.

In essence, sports are physical activities that involve elements of play and competition whether against oneself or against others. One aspect of sports within the realm of competitive sports is

the competitive format, where such activities must be carried out with a spirit of enthusiasm and sportsmanship. Sports also foster mutual understanding and a strong sense of solidarity among players and teammates, while promoting selflessness. Sports achievements are a national asset that can be a source of pride and inspire a sense of nationalism among citizens. Furthermore, they can serve as a benchmark for a nation's progress. Sports can also be a key element in shaping a nation's character and must not be overlooked in contributing to the development of human potential to create a safe, prosperous, and peaceful world.

Indonesia is a country with a strong track record of success in various sports. There are several sports in which the country has been able to compete and excel on the world stage, such as badminton, weightlifting, archery, track and field, pencak silat, taekwondo, boxing, and many others. In recent years, Indonesia has even won gold medals at the Olympic Games, which remains the largest and oldest sporting competition in the world to this day. The sport that has frequently contributed gold medals at the Olympics is badminton; in 1992, 1996, 2000, 2004, 2008, 2016, and 2020, Indonesia consistently brought home gold medals. In addition to badminton, other sports such as weightlifting, archery, volleyball, pencak silat, track and field, and swimming are sports that consistently excel in sporting events across Asia.

One sport that has really stood out in recent years is taekwondo. This was evident in 2018 at the ASEAN Games, where the Indonesian national taekwondo team won several gold medals. Not only that, but at the 2021 Southeast Asian Games, the national taekwondo team also secured gold medals in several taekwondo events. Taekwondo itself is a martial art originating from Korea that has been successfully developed in Indonesia and around the world. According to V Yoyok Suyardi (2002: 7) in (Hanief et al., 2016:17) Taekwondo is a martial art that has been introduced and developed in Indonesia for the past 30 years, evidenced by the fact that at that time, taekwondo was affiliated with the ITF (International Tae Kwon Do Federation), and later the WTF (World Taekwondo Federation) style emerged; in 1982, these merged to form TI (Taekwondo Indonesia). The growth of taekwondo as a sport in Indonesia has attracted enthusiasts of all ages from children and teenagers to adults who wish to learn and train, as taekwondo is open to the public.

In addition, Nam and Lim (2019) also noted that taekwondo has been popular worldwide since 2000 as an Olympic sport. Council and Jordan (2018) pointed out that taekwondo is no longer unfamiliar to Indonesians, who have successfully won numerous gold medals in the Women's Individual Poomsae category. Given its development in Indonesia to date, Indonesia's performance in taekwondo has been quite commendable, as evidenced by gold medals won in various competitions most notably at the ASEAN Games and SEA Games in recent years. However, there is still room for improvement when considering the categories and the medals secured (Hanief et al., 2016: 86). Therefore, a re-examination is needed from a technical perspective regarding the factors influencing the performance or achievements of these athletes. In taekwondo matches themselves, there are several techniques such as kicks and strikes (fist and foot), which cause the opponent's body to shift (World Taekwondo, 2018).

The fist technique in taekwondo involves punching with a tightly clenched fist and striking the opponent's body within the permitted areas. Meanwhile, foot techniques, or kicks, are frequently used by athletes in competitions, particularly in matches or in the fighting category (World Taekwondo, 2018; Mmendolia et al., 2011; Tornello et al., 2014) (Sabatani, Ni, Koman et al., 2019: 86). In Taekwondo fighting-category matches, kicking techniques are frequently used as an effective means of attacking opponents and earning points from judges or referees. Fundamentally, basic kicks are essential for every athlete to master, as they form a strong foundation for learning more advanced kicking techniques. There are several kicking techniques frequently used in taekwondo matches, one of which is the Roundhouse kick and Dollyo changi (Wasik and Shan: 2015).

In taekwondo competitions, whether in the fighting or artistic categories, athletes must demonstrate flawless technical movements, strong and effective power, balance, stamina, flexibility, and mental focus. For example, flawless technical movements during a match result in points, enabling the athlete to win the match. Since taekwondo matches are quite time-consuming and undoubtedly physically demanding, a taekwondo athlete must possess good endurance; with good endurance, a taekwondo athlete particularly in the poomsae category can maintain the perfection of their movements throughout the match. Among the various techniques in taekwondo, these are directly related to the physical condition of each athlete. According to (Edi Azwar, 2021: 138), he states that the factor that must be considered in sports is physical condition, as physical condition is one of the most important

supporting factors in every athlete's achievement of success in any sport, including taekwondo. Physical condition must be thoroughly assessed well in advance of practicing basic and advanced techniques, as it will influence the outcome of a match whether an athlete wins or loses. In addition, athletes are required to be in good physical condition so they can perform at their best during competitions.

Given the nature and status of athletes, it is essential to understand their physical condition so that it can support their performance during competitions. There are several components of athletic physical condition that need to be understood first. Furthermore, as stated by Sajoto (1995: 16) in (Edi Azwar, 2021: 138), there are 10 components of physical condition, including: (1) strength; (2) endurance; (3) muscular power; (4) speed; (5) flexibility; (6) agility; (7) coordination; (8) balance; (9) accuracy; and (10) reaction. Every athlete has different physical conditions. This is due to several reasons, including the coach's inadequate management of the athlete's training program, the coach's lack of understanding of the factors affecting the athlete's physical condition, and the fact that athletes still rarely undergo initial physical condition tests to support the subsequent training program that will be implemented.

Differences in the physical condition of each athlete are also influenced by the coaches' ability to manage the PPLP program for each athlete. The Student Education and Training Center, often referred to as PPLP, is a concept for developing talented athletes at the regional and provincial levels. The development of talented athletes depends heavily on the implementation of the training program. Student training and development centers are one manifestation of the training management system designed to achieve the desired outcome: athletes who excel at the local, provincial, and national levels. The objective of this development is to identify prospective athletes who possess talent and potential aligned with their capabilities and interests, thereby increasing their chances of success in the development program and enabling them to achieve the expected achievements (Rohman & Yusuf Effendi, 2019: 113).

The development of athletic excellence, in accordance with appropriate concepts and management practices, must be carried out through specific processes and stages over a defined period of time. As noted by Rohman & Yusuf Effendi (2019: 114), one such effort in the development of athletic excellence involves collaboration between the Ministry of Education and Culture (Kemendikbud) and the Ministry of Youth and Sports (KEMENPORA) and the Indonesian National Sports Committee (KONI) to establish integrated athlete development centers in several provinces in the form of Student Education and Training Centers (PPLP), which constitute Indonesia's early-stage sports performance development system and play a role in producing athletes who excel in both sports and academics.

Based on the concept above, the researcher sought to investigate the physical condition profiles of taekwondo athletes. This study focuses on the physical condition profile of taekwondo athletes, as their physical condition is crucial for continuously monitoring their ability to achieve performance goals. By having a clear understanding of the athletes' physical condition profiles, coaches are expected to be able to fully assess, monitor, and implement training programs that have been designed and tailored to the specific physical goals of each individual athlete. Currently, the Banten Province PPLP taekwondo branch has implemented physical condition tests for its athletes at the very beginning of the program specifically during the selection process to become Banten Province PPLP athletes. This aims to allow coaches to assess the athletes' initial abilities and physical condition so that they can provide training programs suited to the athletes, thereby yielding the desired training results. Numerous studies have addressed physical fitness across various sports disciplines, such as the research conducted by (Aryatama, 2021: 45) in the study titled "Physical Fitness of the Purbolinggo High-Performance Athletics Club," which yielded the following results: the average level of endurance (VO2Max) was classified as moderate, with a result of 43.48. The average lower-body muscle strength score was 169.33, classified as moderate. The average explosive power score was 4.34 seconds, classified as good. And the average flexibility score was 43.48, classified as moderate. Additionally, in a study conducted by (Lindianawati et al., 2022: 74-75) titled "Analysis of the Physical Condition of Wushu Sanda Athletes in Ngawi Regency in Preparation for the 2022 Provincial Sports Week," the following results were obtained: physical condition for speed at 62.5%, categorized as moderate. Physical strength was 75%, categorized as good. Physical flexibility was 50%, categorized as good. Physical agility was 75%, categorized as good, and cardiovascular endurance was 87.5%, categorized as adequate.

Based on the two research findings above, which provide insights into the physical condition and skills of athletes, this study will examine the physical condition profile of prospective PPLP athletes in Banten Province in the sport of taekwondo. The objective of this study is to identify and describe the physical condition profile of prospective PPLP athletes in Banten Province in the sport of taekwondo, while the significance of this study is expected to provide contributions and insights for development and training, particularly in maintaining and improving the physical condition of taekwondo athletes in Banten Province in general and PPLP taekwondo athletes in particular, so that they can achieve the expected performance in accordance with established goals, namely achieving maximum performance at the national and international levels.

METHODS

This study is a descriptive study, which is a type of research that seeks to describe the object or subject under investigation using a quantitative approach. A quantitative approach is one that involves numbers, which are then analyzed using statistics to describe the results (Hardiansyah, 2018) as cited in (Lindianawati et al., 2022:71). The purpose of this descriptive study is to understand and obtain a true picture or reality of the condition of the object under study (Halman, 2016). The method used in this study is a survey method with data collection techniques using test parameters and physical condition measurements. The researcher chose the survey method because it is a method commonly used today, aimed at obtaining characteristics, opinions, and testing hypotheses (Zamawi & Burstiando, 2020).

The population in this study consisted of 10 prospective taekwondo athletes from the Banten Province PPLP, comprising 5 male athletes and 5 female athletes. The sample in this study included all prospective taekwondo athletes from the Banten Province PPLP. The instruments used in this study to collect data were as follows:

- 1) A 30-meter sprint to measure speed.
- 2) Shuttle run to measure agility.
- 3) Push-ups and sit-ups to measure strength.
- 4) Standing board jump and vertical jump to measure explosive power.
- 5) Sit and reach to measure flexibility.
- 6) Tennis ball throw and catch to measure coordination.
- 7) Multistage fitness test to measure endurance.

After the data is collected and processed, the next step is to draw conclusions. To draw conclusions from the collected data, the data is converted into percentages to analyze the descriptive data. The data is then processed using the formula below:

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

Notes:

P = Percentage sought

F = Frequency

N = Number of respondents

RESULTS AND DISCUSSION

The results of the study conducted by the researchers provide an overview of the physical condition of the prospective taekwondo athletes of the Banten Province PPLP in 2022. The data collected in this study consists of test results and measurements, including tests of speed, agility, strength, power, flexibility, coordination, and endurance. The following are the test results and measurements for the prospective 2022 Banten Province PPLP taekwondo athletes:

Table 1. Physical Fitness Test Results for Prospective PPLP Athletes in the Banten Province Taekwondo Team

NUMB.	GENDER	SPEED	AGILITY	STRENGTH		EXPLOSIVE POWER		FLEXIBILITY	COORDINATION	ENDURANCE
		SPRINT 30 M	SHUTTLE RUN	PUSH UP	SIT UP	SBJ	VERTICAL JUMP	SIT AND REACH	LTBT	MFT
1	M	5,33	8,06	15	44	1,7	45	27	15	27,4
2	M	4,69	7,77	32	53	2,23	47	20	20	40,5
3	M	5,35	8,24	46	60	1,89	42	18	9	42,4
4	F	5,47	9,13	42	51	1,56	40	24	6	31,8
5	M	5	8,37	55	55	1,98	46	16	12	43,9
6	M	4,83	8,05	36	54	2,06	53	30	4	48
7	F	5,78	8,88	46	48	1,6	20	29	7	28,3
8	F	5,19	7,82	36	48	1,84	43	30	15	41,8
9	F	5,85	8,63	41	39	1,31	39	26	1	40,5
10	F	5,36	8,93	31	54	1,6	37	26	6	37,1

Based on the test results in Table 1 above, the descriptive analysis of the physical profile data for prospective PPLP taekwondo athletes in Banten Province reveals the following components of physical condition:

A. Speed

1. Male

Table 2: Speed Test Results (30-meters sprint) for male taekwondo athletes in training at the Banten Province PPLP

Test Score	Male		Category
	∑ Subjects	Percentage (%)	
≤ 3,5 seconds	0	0 %	Excellent
3,5 – 4,0 seconds	0	0 %	Good
4,1 – 5,4 seconds	5	100 %	Fair
5,4 – 6,6 seconds	0	0 %	Poor
≥ 6,6 seconds	0	0 %	Very poor
Amount	5	100%	

The table above shows that the speed test results for male taekwondo athletes in the Banten Province PPLP program were as follows: 0% (0 athletes) in the “very good” category, 0% (0 athletes) in the “good” category, 100% (5 athletes) in the “fair” category, the “poor” category at 0% (0 athletes), and the “very poor” category at 0% (0 athletes).

2. Female

Table 3. Speed test results (30-meter sprint) for female taekwondo athletes in the Banten Province PPLP

Test Score	Female		Category
	∑ Subjects	Percentage (%)	
≤ 4,3 seconds	0	0 %	Excellent
4,4 – 5,6 seconds	3	60 %	Good
5,7 – 6,2 seconds	2	40 %	Fair
6,3 – 7,0 seconds	0	0 %	Poor
≥ 7,0 seconds	0	0 %	Very poor
Amount	5	100%	

The table above shows that the speed test results for male taekwondo athletes in the Banten Province PPLP program were as follows: 0% (0 athletes) in the “very good” category, 60% (3 athletes) in the “good” category, 40% (2 athletes) in the “fair” category, the “poor” category at 0% (0 athletes), and the “very poor” category at 0% (0 athletes).

Based on the speed test results of prospective taekwondo athletes from the Banten Province PPLP in the men’s category, 5 athletes recorded times in the 4.1–5.4-second range, with 100% of them falling into the “adequate” category. Meanwhile, the average time for these five athletes was 5.06 seconds, which also falls into the “adequate” category. In the women’s category, out of 5 athletes, 3 athletes recorded times in the 4.4–5.6-second range, placing them in the “good” category (60%), while 2 athletes recorded times in the 5.7–6.2-second range, placing them in the “adequate” category (40%). when viewed from the average of the five athletes, they achieved a time of 5.53 seconds, which falls into the “good” category. The results obtained in the men’s category indicate that performance is already quite good, and in the women’s category, it is also quite good. However, the coach still needs to improve each athlete’s speed level to support their performance in every competition held. Speed training in taekwondo is very important and influential for every athlete because it can develop speed in the athletes’ kicking and punching movements, allowing them to be maximized when the athletes compete.

Speed is the ability to move from one place to another in the shortest possible time (Amung Ma`mun, 2003:18) as cited in (Hanief et al., 2016:20). In line with previous research conducted by (Yakin & Hasibuan, 2021) in (Lindianawati et al., 2022:75), which showed that the results indicated that speed training can influence and improve athletes’ kicking speed, as evidenced by a calculated t-value > table t-value (2.54 > 0.05). Meanwhile, according to Wasik and Shan (2015) in (Sabatani, Ni, Koman et al., 2019:88), there are three factors in speed training in taekwondo: first, the presence of a physical target which can be a board or an air target—that influences the athlete’s kicking speed; second, training with a physical target directs explosive power to balance muscle strength control with segmental speed, and third, speed is influenced by the athlete’s control accuracy.

B. Agility

1. Male

Table 4. Agility test results (shuttle run) for male taekwondo athletes in the Banten Province PPLP

Test Score	Male		Category
	∑ Subjects	Percentage (%)	
≤ 5,51 seconds	0	0 %	Excellent
6,61 – 5,51 seconds	0	0 %	Good
7,52 – 6,52 seconds	0	0 %	Fair
8,53 – 7,53 seconds	5	100 %	Poor
≥ 8,53 seconds	0	0 %	Very poor
Amount	5	100%	

The table above shows that the agility test results for male taekwondo athletes in the Banten Province PPLP program were as follows: 0% (0 athletes) in the “excellent” category, 0% (0 athletes) in the “good” category, 0% (0 athletes) in the “fair” category, the “poor” category at 100% (5 athletes), and the “very poor” category at 0% (0 athletes).

2. Female

Table 5. Agility test results (shuttle run) for female taekwondo athletes in the Banten Province PPLP

Test Score	Female		Category
	∑ Subjects	Percentage (%)	
≤ 6,01 seconds	0	0 %	Excellent
7,00 – 6,01 seconds	0	0 %	Good

8,00 – 7,01 seconds	1	20 %	Fair
9,00 – 8,02 seconds	3	60 %	Poor
≥ 9,01 seconds	1	20 %	Very poor
Amount	5	100%	

The table above shows that the agility test results for female taekwondo athletes in the Banten Province PPLP program were as follows: 0% (0 athletes) in the “excellent” category, 0% (0 athletes) in the “good” category, 20% (1 athlete) in the “fair” category, the “poor” category at 60% (3 athletes), and the “very poor” category at 20% (1 athlete).

Based on the results of the agility analysis of prospective taekwondo athletes from the Banten Province PPLP in 2022, the men’s sector showed test scores in the 8.53–7.53-second range, falling into the “poor” category, with 100% of the 5 athletes in this category. In the women’s sector, test scores in the 8.00–7.01 second range fell into the “adequate” category, with 1 athlete (20%); the 9.00–8.01 second range fell into the “below average” category, with 3 athletes (60%); and times exceeding 9.01 seconds fell into the “very below average” category, with 1 athlete. Based on the results from each sector, the male athletes had an average time of 8.22 seconds, which falls into the “below average” category, while the female athletes had an average time of 8.68 seconds, which also falls into the “below average” category. Given these results for both male and female sectors, there is still a significant need for improvement to support the athletes’ performance during competitions. Coaches must be aware of this as the first consideration when designing an appropriate training program so that athletes’ performance can improve both during training and in competition. Good agility can enhance an athlete’s performance quality during competition. In taekwondo, agility serves to nimbly evade an opponent’s attacks, whether punches or kicks.

According to Mappaampo (2011) as cited in (Malasari, 2019:82), agility is a movement that requires an athlete or player to move quickly, change direction, and act nimbly. In line with this, (Malasari, 2019:86) stated in her research that there is a significant effect on improving athletes’ agility using the shuttle run training method. This is further supported by the results of his study, as evidenced by the t-test on the final agility test of taekwondo athletes at Dojang Saburai, which showed a t-value of 2.26 with $df = 9$ at a 5% significance level. The t-value is greater than the critical t-value, and the probability (P) is 0.000 (< 0.05). Additionally, another study conducted by Irawan (2008) cited in (Malasari, 2019:86) showed that there was an improvement in ball-dribbling skills after soccer club participants completed a shuttle run training program, with a t-calculated value of 14.736 $>$ t-table value of 2.26.

C. Strength

1. Male

a. Push up

Table 6. Strength test results (push-ups) for male taekwondo athletes in the Banten Province PPLP

Test Score	Male		Category
	∑ Subjects	Percentage (%)	
≤ 17	1	20 %	Excellent
19 – 22	0	0 %	Good
23 – 28	0	0 %	Fair
29 – 38	2	40 %	Poor
≥ 39	2	40 %	Very poor
Amount	5	100%	

The table above shows that the strength test results for male taekwondo athletes in the Banten Province PPLP program were as follows: 40% (2 athletes) in the “very good” category, 40% (2 athletes)

in the “good” category, 0% (0 athletes) in the “adequate” category, the “poor” category at 0% (0 athletes), and the “very poor” category at 20% (1 athlete).

b. Sit up

Table 7. Strength test results (sit-ups) for male taekwondo athletes in the Banten Province PPLP

Test Score	Male		Category
	∑ Subjects	Percentage (%)	
≤ 32	0	0 %	Excellent
33 – 37	0	0 %	Good
38 – 41	0	0 %	Fair
42 – 47	1	20 %	Poor
≥ 48	4	80 %	Very poor
Amount	5	100%	

The table above shows that the strength test results for male taekwondo athletes in the Banten Province PPLP program were 80% in the “very good” category (4 athletes), 20% in the “good” category (1 athlete), 0% in the “adequate” category (0 athletes), the “poor” category at 0% (0 athletes), and the “very poor” category at 0% (0 athletes).

2. Female

a. Push up

Table 8. Strength test results (push-ups) for female taekwondo athletes in the Banten Province PPLP

Test Score	Female		Category
	∑ Subjects	Percentage (%)	
≤ 11	0	0 %	Excellent
12 – 17	0	0 %	Good
18 – 24	0	0 %	Fair
25 – 32	1	20 %	Poor
≥ 33	4	80 %	Very poor
Amount	5	100%	

The table above shows that the strength test results for female taekwondo athletes in the Banten Province PPLP program were 80% in the “very good” category (4 athletes), 20% in the “good” category (1 athlete), 0% in the “adequate” category (0 athletes), the “poor” category at 0% (0 athletes), and the “very poor” category at 0% (0 athletes).

b. Sit up

Table 9. Strength test results (sit-ups) for female taekwondo athletes in the Banten Province PPLP

Test Score	Woman		Category
	∑ Subjects	Percentage (%)	
≤ 26	0	0 %	Excellent
27 – 30	0	0 %	Good
31 – 35	0	0 %	Fair
36 – 41	0	0 %	Poor
≥ 42	5	100 %	Very poor

Amount	5	100%	
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The table above shows that the strength test results for male taekwondo athletes in the Banten Province PPLP program were 100% in the “very good” category (5 athletes), 0% in the “good” category (0 athletes), 0% in the “fair” category (0 athletes), the “poor” category at 0% (0 athletes), and the “very poor” category at 0% (0 athletes).

Based on the results of the push-up strength test conducted on male taekwondo athletes from the Banten Province PPLP, the test results showed that scores in the <17 range fell into the “very poor” category, with 1 athlete (20%) in this category; 29 – 38 falling into the “good” category (40%), comprising 2 athletes, and scores of >39 falling into the “very good” category (40%), comprising 2 athletes. Meanwhile, in the women’s athlete sector, the test results showed that scores in the 25–32 range fell into the “good” category (20%, 1 athlete), and scores >33 fell into the “very good” category (80%, 4 athletes). From these results, it can be seen that the average for each sector, both male and female, is a score of 37 in the male athlete sector, which falls into the “good” category, and a score of 39 in the female athlete sector, which falls into the “very good” category.

Based on the results of the strength test using the sit-up method conducted on male taekwondo athletes from the Banten Province PPLP, the test results showed scores ranging from 42 to 47, which fall into the “very good” category, with 1 athlete (20%) achieving this score, and scores of >48, which also fall into the “very good” category, with 4 athletes (80%) achieving this score. Meanwhile, in the women’s sector, the test results showed scores of >42, which falls into the “very good” category with a 100% percentage for 5 athletes. From these results, the average scores for both the men’s and women’s sectors are 52 for the men’s sector (falling into the “very good” category) and 48 for the women’s sector (falling into the “very good” category).

Based on the results obtained from strength tests conducted on prospective taekwondo athletes from the Banten Province PPLP using push-up and sit-up tests, which showed positive results, these findings can serve as a reference for coaches in designing training programs aimed at improving athletes’ performance during competitions, as well as providing coaches with an initial benchmark for assessing each athlete’s physical condition. In line with this, a study conducted by Wasisto et al. (2017) cited in Sabatani, Ni, Koman et al. (2019:91-92) indicates that strength in taekwondo is influenced by the Poomsae and Kyorugi disciplines, which are distinct technical categories in taekwondo competitions with differing objectives. In the Poomsae category, the techniques showcase and enhance basic movement skills in taekwondo, whereas the Kyorugi category requires higher muscle strength than Poomsae. This is because defense and attack in Kyorugi are comprehensive in nature, so more muscle strength training is provided compared to the Poomsae category.

D. Explosive Power

1. Man

a. Vertical jump

Table 10. Results of the vertical jump test for male taekwondo athletes in the Banten Province PPLP

Test Score	Male		Category
	∑ Subjects	Percentage (%)	
≥ 66 cm	0	0 %	Excellent
53 – 65	1	20 %	Good
42 – 52	4	80 %	Fair
31 – 41	0	0 %	Poor
≤ 31	0	0 %	Very poor
Amount	5	100%	

The table above shows that the explosive power test results for male taekwondo athletes in the Banten Province PPLP program were as follows: 0% (0 athletes) in the “excellent” category, 20% (1

athlete) in the “good” category, 80% (4 athletes) in the “adequate” category, the “poor” category at 0% (0 athletes), and the “very poor” category at 20% (1 athlete).

b. Standing Board Jump (SBJ)

Table 11. Results of the explosive power test (standing board jump) for male taekwondo athletes in the Banten Province PPLP

Test Score	Male		Category
	∑ Subjects	Percentage (%)	
≥ 2,80	0	0 %	Excellent
2,54 – 2,79	0	0 %	Good
2,20 – 2,53	1	20 %	Fair
1,90 – 2,19	2	40 %	Poor
≤ 1,89	2	40 %	Very poor
Amount	5	100%	

The table above shows that the explosive power test results for male taekwondo athletes in the Banten Province PPLP program were as follows: 0% (0 athletes) in the “excellent” category, 0% (0 athletes) in the “good” category, 20% (1 athlete) in the “adequate” category, the “poor” category at 40% (2 athletes), and the “very poor” category at 40% (2 athletes).

2. Female

a. Vertical jump

Table 12. Results of the vertical jump test for female taekwondo athletes in the Banten Province PPLP

Test Score	Female		Category
	∑ Subjects	Percentage (%)	
≥ 50 cm	0	0 %	Excellent
39 – 49	3	60 %	Good
30 – 38	1	20 %	Fair
21 – 29	0	0 %	Poor
≤ 21cm	1	20 %	Very poor
Amount	5	100%	

The table above shows that the explosive power test results for female taekwondo athletes in the Banten Province PPLP program were as follows: 0% (0 athletes) in the “excellent” category, 60% (3 athletes) in the “good” category, 20% (1 athlete) in the “adequate” category, the “poor” category at 0% (0 athletes), and the “very poor” category at 20% (1 athlete).

b. Standing Board Jump (SBJ)

Table 13. Results of the explosive power test (standing board jump) for female taekwondo athletes in the Banten Province PPLP

Test Score	Female		Category
	∑ Subjects	Percentage (%)	
≥ 2,55	0	0 %	Excellent
2,25 – 2,54	0	0 %	Good
2,00 – 2,24	0	0 %	Fair

1,60 – 1,99	3	60 %	Poor
≤ 1,59	2	40 %	Very poor
Amount	5	100%	

The table above shows that the explosive power test results for female taekwondo athletes in the Banten Province PPLP program were as follows: 0% (0 athletes) in the “excellent” category, 0% (0 athletes) in the “good” category, 0% (0 athletes) in the “adequate” category, the “poor” category at 60% (3 athletes), and the “very poor” category at 40% (2 athletes).

According to Azzannul (2019) as cited in (Wahyuni & Donie, 2020:2), explosive power is the ability of muscles to generate force in a very short period of time to impart maximum momentum to the body or an object during an explosive movement in order to achieve the desired goal. Based on the results of explosive power tests conducted on prospective taekwondo athletes at the Banten Province PPLP, the following results were obtained:

Based on the results of the explosive power test using the standing board jump (SBJ), the test scores obtained were 2.20–2.53 meters, which falls into the “adequate” category (20% of athletes), 1.90–2.19 meters, which falls into the “poor” category (40%), with 2 athletes; and <1.89 meters, which falls into the “very poor” category (40%), with 2 athletes. Meanwhile, in the female athletes’ category, test scores ranged from 1.60–1.99 meters, falling into the “poor” category (60%), with 3 athletes; and <1.59 meters, falling into the “very poor” category (40%), with 2 athletes. Based on the test scores obtained, the male athletes had an average test score of 1.97 meters, which falls into the “below average” category, while the female athletes had an average test score of 1.58 meters, which falls into the “very below average” category.

Based on the results of the vertical jump test, the scores obtained were 53–65 cm, which falls into the “good” category (20%), with 1 athlete, and 42–52 cm, which falls into the “fair” category (80%), with 4 athletes. Meanwhile, in the women’s category, test scores of 39–49 cm fell into the “good” category (60%), with 3 athletes; 30–38 cm fell into the “adequate” category (20%), with 1 athlete; and <21 cm fell into the “very poor” category (20%), with 1 athlete. Based on the test scores obtained, the male athletes had an average test score of 47 cm, which falls into the “sufficient” category, while the female athletes had an average test score of 36 cm, which also falls into the “sufficient” category.

Based on the results obtained from the explosive power tests conducted on prospective taekwondo athletes from the Banten Province PPLP using the standing board jump and vertical jump tests, the results were quite good; however, they still need to be improved further to support the athletes’ performance during competitions and enhance their mastery of techniques. In line with this, there is relevant research on explosive power in taekwondo, namely a study conducted by Ariansyah et al. (2017) cited in (Sabatani, Ni, Koman et al., 2019:93), which states that good explosive power in the leg muscles results in good performance in the dollyo changi kicking technique. Additionally, research by Asy`ari (2017) also indicates that there is a relationship between leg length and leg power, which contributes to the execution of the dollyo changi kick in taekwondo.

E. Flexibility

1. Male

Table 14. Flexibility test results (sit-and-reach) for male taekwondo athletes in the Banten Province PPLP

Category	Male	
	∑ Subjects	Percentage (%)
Excellent	5	100 %
Good	0	0 %
Fair	0	0 %

Poor	0	0%
Very poor	0	0%
Amount	5	100%

The table above shows that the flexibility test results for male taekwondo athletes in the Banten Province PPLP program were 100% in the “excellent” category (5 athletes), 0% in the “good” category (0 athletes), 0% in the “fair” category (0 athletes), the “poor” category at 0% (0 athletes), and the “very poor” category at 0% (0 athletes).

2. Female

Table 15. Flexibility test results (sit-and-reach) for female taekwondo athletes in the Banten Province PPLP

Category	Female	
	∑ Subjects	Percentage (%)
Excellent	5	100 %
Good	0	0 %
Fair	0	0 %
Poor	0	0%
Very poor	0	0%
Amount	5	100%

The table above shows that the flexibility test results for female taekwondo athletes in the Banten Province PPLP program were 100% in the “excellent” category (5 athletes), 0% in the “good” category (0 athletes), 0% in the “fair” category (0 athletes), the “poor” category at 0% (0 athletes), and the “very poor” category at 0% (0 athletes).

Flexibility is one of the most important biomechanical components in sports, particularly in martial arts such as taekwondo. This component significantly influences other biomechanical components because flexibility is a fundamental element that must be maintained (Rohman & Yusuf Effendi, 2019:119). Based on the flexibility test results of prospective taekwondo athletes at the Banten Provincial PPLP, the following results were obtained: in the male athlete sector, 5 athletes achieved a test score > 19.0, which falls into the “very good” category with a 100% success rate; and in the female athlete sector, all athletes achieved a test score > 20.0, which falls into the “very good” category. Additionally, in the male athlete sector, the average test score was 23, which falls into the “very good” category, and in the female athlete sector, the average test score was 27, which falls into the “very good” category.

Based on the results obtained, the physical condition of prospective taekwondo athletes from the Banten Province PPLP in terms of flexibility is already very good; however, coaches must continue to train the athletes’ flexibility to ensure continuous improvement in each athlete and to support their performance during competitions. Additionally, coaches must be innovative and responsive in analyzing the test results obtained from each athlete, so that the training programs designed align with the goals to be achieved. Irwandi (2010) in (Lindianawati et al., 2022:75) states that improving athletes’ flexibility is crucial because flexibility allows the body to move to its fullest extent within the range of motion of joints, muscles, tendons, and ligaments.

D. Coordination

1. Male

Table 16. Coordination test results (LTBT) for male taekwondo athletes in the Banten Province PPLP

Test Score	Male		Category
	∑ Subjects	Percentage (%)	
≥ 35	0	0 %	Excellent
30 – 35	0	0 %	Good
25 – 29	0	0 %	Fair
20 – 24	1	20 %	Poor
≤ 20	4	80 %	Very poor
Amount	5	100%	

The table above shows that the coordination test results for male taekwondo athletes in the Banten Province PPLP program were 0% in the “excellent” category (0 athletes), 0% in the “good” category (0 athletes), 0% in the “fair” category (0 athletes), the “poor” category at 20% (1 athlete), and the “very poor” category at 80% (4 athletes).

2. Woman

Table 17. Coordination test results (LTBT) for female taekwondo athletes in the Banten Province PPLP

Test Score	Female		Category
	∑ Subjects	Percentage (%)	
≥ 30	0	0 %	Excellent
25 – 30	0	0 %	Good
20 – 24	0	0 %	Fair
15 – 19	1	20 %	Poor
≤ 15	4	80 %	Very poor
Amount	5	100%	

The table above shows that the coordination test results for female taekwondo athletes in the Banten Province PPLP program were 0% in the “excellent” category (0 athletes), 0% in the “good” category (0 athletes), 0% in the “fair” category (0 athletes), the “poor” category at 20% (1 athlete), and the “very poor” category at 80% (4 athletes).

Based on the results of the coordination tests conducted on prospective taekwondo athletes from the Banten Province PPLP, the following results were obtained: in the men’s category, 1 athlete (20%) scored 20–24 on the test, falling into the “poor” category, while 4 athletes (80%) scored <20, falling into the “very poor” category; while in the female athlete sector, test scores of 15–19 were recorded, falling into the “poor” category with a 20% rate (1 athlete), and scores below 15 fell into the “very poor” category with a 80% rate (4 athletes). In addition, the average test score for male athletes was 12, which falls into the “very poor” category, while female athletes had an average test score of 7, which falls into the “very poor” category.

The results indicate that the coordination levels of prospective taekwondo athletes in the Banten Province PPLP still need significant improvement to support their performance during competitions. Coaches must be able to provide appropriate training programs so that athletes’ coordination levels can improve and do not hinder performance enhancement. The suitability of the training programs designed by coaches significantly influences the improvement of athletes’ coordination. Therefore, the results of the coordination tests above should serve as a reference and initial benchmark for coaches in improving their athletes’ coordination levels. According to (Ngurah Adi Santika & Agung Cahya Prananta,

2022:8), the relationship between eye-foot coordination and the momtong dollyo changi kick is directly proportional, meaning there is a correlation between these two variables. This indicates that if one wishes to improve the momtong dollyo changi kick, the aspect of eye-foot coordination must not be neglected.

E. Endurance

1. Male

Table 20: Endurance Test (MFT) Results for Male Taekwondo Prospects at the Banten Province PPLP

Test Score	Male		Category
	∑ Subjects	Percentage (%)	
≥ 48	1	20 %	Excellent
42 – 47	2	40 %	Good
38 – 41	1	20 %	Fair
33 – 37	0	0 %	Poor
≤ 32	1	20 %	Very poor
Amount	5	100%	

The table above shows that the results of the multistage fitness test (MFT) for male taekwondo athletes in the Banten Province PPLP program were as follows: 20% (1 athlete) in the “very good” category, 40% (2 athletes) in the “good” category, 20% (1 athlete) in the “fair” category, the “poor” category at 0% (0 athletes), and the “very poor” category at 20% (1 athlete).

2. Female

Table 21: Endurance Test (MFT) Results for Female Taekwondo Prospects at the Banten Province PPLP

Test Score	Female		Category
	∑ Subjects	Percentage (%)	
≥ 42	1	20 %	Excellent
36 – 41	2	40 %	Good
31 – 35	1	20 %	Fair
27 – 30	1	20 %	Poor
≤ 26	0	0 %	Very poor
Amount	5	100%	

The table above shows that the results of the multistage fitness test (MFT) for female taekwondo athletes in the Banten Province PPLP program were as follows: 20% (1 athlete) in the “very good” category, 40% (2 athletes) in the “good” category, 20% (1 athlete) in the “fair” category, the “poor” category at 20% (1 athlete), and the “very poor” category at 0% (0 athletes).

Endurance is a fundamental aspect of physical conditioning in every sport and serves as the most essential factor in improving other aspects of physical fitness. Athletes with good or above-average endurance are able to handle intense training regimens and recover quickly from fatigue. Based on the endurance test results conducted on prospective taekwondo athletes from the Banten Provincial PPLP, the following results were obtained: in the male athlete category, 1 athlete scored >48, falling into the “very good” category (20%); 2 athletes scored 42–47, falling into the “good” category (40%); 1 athlete scored 38 – 41, which falls into the adequate category (20% of athletes, 1 athlete), and < 32, which falls into the very poor category (20% of athletes, 1 athlete). In the female athlete sector, test scores of > 42 fell into the very good category (20% of athletes, 1 athlete), 36 – 41 falling into the good category (40%), 2 athletes; 31 – 35 falling into the fair category (20%), 1 athlete; and 27 – 30 falling into the poor category (20%), 1 athlete.

Based on the average scores obtained, the male athletes scored 45, which falls into the “good” category, while the female athletes scored an average of 36, also falling into the “good” category. These results indicate that the endurance levels of the prospective taekwondo athletes at the Banten Province PPLP are already good; however, coaches are advised to further improve each athlete’s endurance to support their performance during competitions. As stated by Formalioni et al. (2020) in (Abdulloh & Jatmiko, 2021:8), aerobic fitness plays a crucial role for every athlete, particularly in the sport of taekwondo, as it relates to the athlete’s ability to recover quickly during competition. Additionally, Indrayana (2012) noted that in every match, taekwondo athletes must possess good cardiovascular endurance.

CONCLUSION

Based on the results of the research and discussion above regarding the physical condition profiles of prospective athletes for the 2022 Banten Province PPLP in the sport of taekwondo, the following conclusions can be drawn:

1. Speed (30-meter sprint)
In the male athletes’ category, the average test score was 5.06 seconds, which falls into the “adequate” category, while in the female athletes’ category, the average test score was 5.53 seconds, which falls into the “good” category.
2. Agility (Shuttle run)
In the male athletes’ category, the average test score was 8.22 seconds, which falls into the “poor” category, while in the female athletes’ category, the average test score was 8.68 seconds, which falls into the “poor” category.
3. Strength (Push-ups and Sit-ups)
In the male athletes’ category, the average push-up test score was 37, which falls into the “good” category, and the average sit-up test score was 52, which falls into the “very good” category. Meanwhile, in the female athletes’ category, the average push-up test score was 39, which falls into the “very good” category, and the average sit-up test score was 48, which falls into the “very good” category.
4. Explosive Power (Standing Board Jump and Vertical Jump)
In the men’s division, the average standing board jump score was 1.97 meters, which falls into the “below average” category, and the average vertical jump score was 47 cm, which falls into the “adequate” category. Meanwhile, in the women’s division, the average standing board jump score was 1.58 meters, which falls into the “very below average” category, and the average vertical jump score was 36 cm, which falls into the “adequate” category.
5. Flexibility (Sit and Reach)
In the men’s division, the average test score was 23 cm, which falls into the “very good” category, and in the women’s division, the average test score was 27 cm, which falls into the “very good” category.
6. Coordination (Tennis Ball Throw and Catch)
In the men’s division, the average test score was 12, which falls into the “very poor” category, and in the women’s division, the average test score was 7, which falls into the “very poor” category.
7. Endurance (Multistage Fitness Test)
In the men’s division, the average test score was 45, which falls into the “good” category, and in the women’s division, the average test score was 36, which falls into the “good” category.

REFERENCES

- Abdulloh, B. H., & Jatmiko, T. (2021). Standarisasi Kondisi Fisik Atlet Taekwondo Puslatda Jawa Timur. *Jurnal Prestasi Olahraga*. <https://ejournal.unesa.ac.id/index.php/jurnal-prestasi-olahraga/article/view/40660>
- Aryatama, B. (2021). Kondisi Fisik Klub Olahraga Prestasi Cabor Atletik Purbolinggo. *Sport Science and Education Journal*, 2(2), 36–46. <https://doi.org/10.33365/ssej.v2i2.1161>

- Chang, S., T., Evans J, Crowe S, Zhang X, & Shan G. (2011). An innovative approach for real time determination of power and reaction time in a martial arts quasi-training environment using 3D motion capture and EMG measurements. *Arch Budo*, 7(3), 185–96.
- Council, O., & Jordan, J., O., R. (2018). Oca Result Books, (Online), (http://www.ocagames.com/orb/ag18_2018.php).
- Edi Azwar, R. (2021). Tingkat Kondisi Fisik Atlet Taekwondo PPLP Aceh Tahun 2020. *Serambi*, 3(4), 135–146.
- Hanief, N., Puspodari, Lusianti, S., & Apriliyanto, A. (2016). Profil Kondisi Fisik Atlet Junior Taekwondo Puslatkot Kediri Tahun 2016 Dalam Menghadapi Pekan Olahraga Provinsi (Porprov) Jawa Timur Tahun 2017. *Jurnal Kejaora*, 1(November 2016), 17–28. <https://ejournal.unibabwi.ac.id/index.php/kejaora/article/view/44/31>
- Lindianawati, N. A., Darumoyo, K., & Utomo, A. W. B. (2022). Analisis Kondisi Fisik Atlet Wushu Sanda Kabupaten Ngawi Dalam Menghadapi Pekan Olahraga Provinsi 2022. *Jendela Olahraga*, 7(2), 69–77.
- Malasari, C. A. (2019). Pengaruh Latihan Shuttle-Run dan Zig-Zag Run terhadap Kelincahan Atlet Taekwondo. *Gelombang Olahraga: Jurnal Pendidikan Jasmani Dan Olahraga (JPJO)*, 3(1), 81–88. <https://doi.org/10.31539/jpjo.v3i1.828>
- Mmendolia, A., Ona, T., dan Apranica, L. (2011). Effects of official taekwondo competitions on all-out performances of elite athletes. *J Strength Cond Res*, 25(2), 334–9.
- Nam, S., S., & Lim, K. (2019). Effect of Taekwondo Training on Physical Fitness Factors in Korea Elementary Student: A Systematic Review and Meta-analysis. *J Exerc Nurt Biochem*, 23(1), 36–47.
- Ngurah Adi Santika, I. G. P., & Agung Cahya Prananta, I. G. N. (2022). Hubungan Koordinasi Mata Kaki dan Power Otot Tungkai Terhadap Tendangan Momtong Dollyo Chagi. *Jurnal Porkes*, 5(1), 1–11. <https://doi.org/10.29408/porkes.v5i1.5161>
- Rohman, U., & Yusuf Effendi, M. (2019). PROFIL KONDISI FISIK ATLET PPLP PENCAK SILAT JAWA TIMUR. *Jurnal Unimed*, 3(2), 112–121.
- Sabatani, Ni, Koman, G., Nugraha, Hendra, Satria, M., & Dewi, Anak, Ayu, Nyoman, T. (2019). Faktor-Faktor Yang Mempengaruhi Kecepatan, Kekuatan, Dan Daya Ledak Terhadap Tendangan Pada Atlet Taekwondo. *Jurnal Pendidikan Olahraga*, 8(2), 85–89. <https://doi.org/10.31571/jpo.v8i2.1120>
- Tornello, F., Capranica, L., Minganti, C., Chiodo, S., Condello, G., & Tessitore, A. (2014). Technical-tactical analysis of youth Olympic taekwondo combat. *J Strength Cond Res*, 28(4), 1151–7.
- Wahyuni, S., & Donie. (2020). VO2MAX, DAYA LEDAK OTOT TUNGKAI, KELINCAHAN DAN KELENTUKAN UNTUK KEBUTUHAN KONDISI FISIK ATLETTAEKWONDO. *Kondisi Fisik*, 2, 1–13.
- Wasik, J., et al. (2018). The influence of gender, dominant lower limb and type of target on the velocity of taekwon-do front kick. *Acta Bioeng Biome*, 20(2), 133–8, (Online), (<http://www.ncbi.nlm.nih.gov/pubmed/30220721>).
- World Taekwondo. (2018). Competition Rules and Interpretation. *Vet Rec*, 156(9), 261-261.
- Yakin, R. B., & Hasibuan, M. N. (2021). Pengaruh Latihan Speed Dan Agility Terhadap Peningkatan Kecepatan Tendangan Samping Pada Atlet Pencak Silat Putra Perguruan Persilatan Salam Tahun 2020. *Jurnal Ilmiah STOK Bina Guna Medan*, 9(1), 15–23. <https://doi.org/https://doi.org/10.55081/jsbg.v9i1.250>
- Zawawi, M. A., & Burstiando, R. (2020). Profil kondisi fisik atlet senior Wushu Sanda Kediri dalam menghadapi Pekan Olahraga Provinsi (Porprov) Jawa Timur tahun Profile of the physical condition of senior Wushu Sanda puslatkot Kediri atlet in provincial sports event (Porprov) East Jawa 2019. 6(1), 259–271. https://doi.org/https://doi.org/10.29407/js_unpgri.v6i1.14279