



The Comparison of the Power Performance Ability Between Male and Female Taekwondo Athletes

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Abstract

This study analyzed the comparison of the power performance ability between male and female taekwondo athletes training in Sleman Regency in facing the Yogyakarta Special Region Sports Week. The population in this study involved 22 Sleman Regency taekwondo athletes. The total numbers of the samples in this study were 12 male athletes and 8 female athletes. The data analysis in this study utilized statistical analysis of SPSS 25. The results of the study revealed that the age of male and female Sleman Regency taekwondo athletes ranged from 17 to 25 years. The assessment results of the ability regarding the biomotor power components of taekwondo in Sleman athletes, on average, fell into the category of less once. The results showed an average male's right foot triple hop jump test was 6.34 m. The farthest jump was 7.47 m, and the shortest was 4.77 m. The average male's left foot triple hop jump test was 6.17 m. The farthest was 6.30 m, and the shortest was 5.33 m. For female athletes, the average result of the right foot triple hop jump test was 4.93 m. The longest jump reached 6.30 m, and the shortest jump was 4.14. The female athlete's left foot triple hop jump test fell into an average of 4.84 m. The farthest jump reached 5.90 m, and the shortest jump was 3.59 m. Based on this assessment, the quality of Sleman's taekwondo athletes, both males and females, was still far from the good category.

Keywords: *Taekwondo; Power; Athlete*

1. Introduction

Sports show development through achievements. In Indonesia, many elite athletes have qualified for international championships in almost all sports, including taekwondo. Taekwondo is a combat sport without using weapons to defend oneself, which uses skilled techniques, including punches, kick blocks, and parrying, carried out with the hands and feet. The martial art of taekwondo is a combat sport that emphasizes dynamic kicking techniques and footwork (Singh et al., 2018). Taekwondo grew and developed in South Korea and has now spread worldwide. In total, 165 countries have become members of taekwondo. In the course of the development of the sport of taekwondo, it became a sport that was officially competed in the Olympics. Taekwondo has two categories of numbers in competitions: *kyorugi* (fighting) and *poomsei* (stances). Technically, *kyorugi* is carried out with two

athletes facing each other, making physical contact using attack and defense techniques and body parts permitted in the *taekwondo interpretation and rule world taekwondo federation* to obtain the highest points. Meanwhile, *poomsei* is technically done by individuals, pairs, or teams performing a series of moves that have been determined using the correct methods and techniques (Sovia Wahyuni, 2020). The two competition categories of taekwondo, *kyorugi* and *poomsei*, require athletes to have good physical condition during training. Many factors can influence an athlete's success during a game. The main factor that needs to be prepared for a taekwondo competition is an athlete's physical ability. Taekwondo has the main physical motors, namely VO2 Max, strength, and power (Sovia wahyuni, 2020).

Taekwondo's physical conditions are different from other martial arts. This can be seen from using movement tools in taekwondo, which predominantly uses lower-body movement tools and relies on leg strength. Moreover, taekwondo is considered a high-intensity martial arts sport, making it difficult to assess the efforts made by athletes during competitions or simulated fights (Valdes-Badilla et al., 2018). The technical skills quality development in taekwondo martial arts depends on the functional and physical specifics (Haddad, 2014). A taekwondo match aims to overcome the opponent within two minutes between rounds by getting more points using valid kicking and punching techniques toward the permitted area (Khayyat et al., 2020). Using high and fast kicks during a match is a characteristic of taekwondo that differentiates it from other martial arts sports. In fighting, the attack period is carried out for one to five seconds, interspersed with more extended periods of non-attack activity. Both athletes must be able to move at high speed and strength and have physical conditions such as good aerobic endurance, anaerobic, muscle strength, flexibility, speed, and agility (Chaabene et al., 2018).

A successful athlete is a result of physical training, skills, technique, determination, strategy, and psychological readiness. These aspects are essential factors in determining an athlete's success. Judging from the many taekwondo matches held in Indonesia, which can even be participated in by cadets to seniors, this indicates that interest in becoming a taekwondo athlete is very high. Therefore, identifying talent is significant and prominent in selecting athletes in taekwondo to successfully create taekwondo athletes with good quality conditions so that taekwondo achievements, especially in the Special Region of Yogyakarta, continue to increase. Therefore, Sleman Regency athletes participating in the competition in the Yogyakarta Special Region Regional Sports Week in Sleman Regency in 2022 were prepared in a centralized district training camp, and their physical conditions were also monitored. This research aimed to analyze the comparison of the power performance abilities of male and female taekwondo athletes in the Sleman Regency training camp in anticipation of the Yogyakarta Special Region Regional Sports Week.

2. Method

2.1. Research Method

This study employed a comparative descriptive research methodology that analyzes two or more phenomena known as a comparative descriptive research study (Creswell & Creswell, 2018). The following is a description of the method for describing the profile of the physical condition of taekwondo athletes in Sleman Regency. First, the research subjects were gathered to explain the aims and objectives of this research and the benefits that athletes and coaches will get to achieve the best performance. Next, the subjects were measured anthropometrically, namely height and weight. Athletes' power performance abilities were measured using the triple hop jump test to obtain athlete assessment results.

2.2. Research Sample

Sugiyono (2015) states, "The population is the entire research subject." The participants in this study were 22 taekwondo athletes consisting of 11 male athletes and 11 female athletes who were members of the Regional Sports Week training for the Special Region of Yogyakarta, Sleman Regency.

The sampling process in this research used purposive sampling, which Nurhidayat et al. (2019) state is a sampling that requires specific consideration in choosing the sample. The following criteria determined the samples: (1) willingness to be a sample, (2) athletes who have participated in at least district-level competitions, (3) have attended a minimum training camp at the district level, and (4) have been competing for 2 years.

2.3. Data Collection Technique

This research applied the triple hop jump test as a research instrument to determine the power advantages of taekwondo athletes. This test was used through a pretest and posttest with the following procedure: (1) the tester prepares a flat area with a measuring tape and a starting line on one side. (2) Athletes start standing behind the starting line. (3) At the “*yak*” signal, the athlete hops three times with one leg without starting, and the jump touches the ground. (4) Next, the tester measures how far the athlete has reached by looking at the meter tape at the athlete’s last landing point.

2.4. Data Analysis

The data obtained from the measurements were then analyzed by considering the average obtained using SPSS 25. The accepted standards were then analyzed with several previous research results to produce discussions and conclusions about the results of this study.

3. Findings and Discussions

3.1 Findings

Table 1. Anthropometrics of Male and Female Taekwondo Athletes (n=11)

Variable	Mean	SD
Male Athletes’ Ages	17.1	.404
Female Athletes’ Ages	19.9	2.84
Male Athletes’ Heights (m)	167.9	8.22
Female Athletes’ Heights (m)	159.7	5.27
Male Athletes’ Weight (kg)	61.7	7.27
Female Athletes’ Weight (kg)	53.1	7.61

Table 2. The Results of the Triple Hop Jump Test

Variable	Mean	Maximal	Minimal	SD
Right Triple Hop Jump Male Athletes	6.34	7.47	4.77	.740
Right Triple Hop Jump Female Athletes	4.93	6.30	4.14	.624
Left Triple Hop Jump Male Athletes	6.17	7.55	5.33	.627
Left Triple Hop Jump Female Athletes	4.84	5.90	3.59	.626

Table 3. T-test comparison of The Triple Hop Jump Test

Variable	Mean	t	sig.
Triple Hop Jump Kanan	1.41	4.826	.621
Triple Hop Jump Kiri	1.33	4.973	.879

Based on the results shown in Table 1, the athletes who participated in preparations for the Sleman Regency Regional Sports Week Training Center had an average age of 17.1 for male athletes and 19.9 for female athletes. Other results for measuring the height of male taekwondo athletes had an average of 167.9 cm and 159.7 cm for female athletes. The weight measurement results for male taekwondo athletes averaged 61.7 kg and 53.1 kg for female athletes. In taekwondo, an athlete's height and weight can influence the results of physical performance ability tests and other components. The height and weight of a taekwondo athlete is one of the factors for the success of a taekwondo athlete.

It can be seen in Table 2 that this study applied the triple hop jump test to measure the power abilities of taekwondo athletes. The research results show that the average ability of male taekwondo athletes to jump three times with the right foot is 6.34 m, and the standard deviation is 0.74061. The farthest jump a male taekwondo athlete could jump was 7.47 m, and the closest one was 4.77 m. The average ability of male taekwondo athletes to jump three times with the left foot is 6.17 m, and the standard deviation value is 0.62766. The furthest jump a male taekwondo athlete could jump was 7.55 m, and the closest one was 5.33 m. Meanwhile, the average ability of female taekwondo athletes to jump three times with the right foot is 4.93 m, and the standard deviation is 0.62497. The furthest jump a female taekwondo athlete can jump was 6.30 m, and the closest was 4.14m. The average ability of female taekwondo athletes to jump three times with the left foot is 4.84, with a standard deviation of 0.62670. The female taekwondo athlete's farthest jump was 5.90 m, and the closest was 3.59 m.

3.2 Discussions

Based on the data analysis results, the age of male and female Sleman Regency taekwondo athletes ranges from 17 to 25 years. On average, the results of the biomotor power component abilities assessment of Sleman Taekwondo athletes fall into the *very poor* category. These results are shown in Table 2, which also shows that the average triple hop jump test for men's right leg is 6.34 m. The farthest jump was 7.47 m, and the closest was 4.77 m (SD 0.740). The average triple hop jump test for men's left leg is 6.17 m. The farthest jump was 6.30 m, and the closest was 5.33 m. (SD 0.627). Meanwhile, female athletes' average triple hop jump test result for the right leg was 4.93 m. The farthest jump was 6.30 m, and the closest jump was 4.14. (SD 0.624). The average triple hop jump test for the left leg of female athletes is 4.84 m. The farthest jump was 5.90 m, and the shortest was 3.59 m (SD 0.626). Based on this assessment, the power quality of Sleman taekwondo athletes, both male and female, is still far from the *good* category. Comparing the power abilities of the Sleman Regency taekwondo athletes with the West Java provincial team, which was successful at the XVIII Riau National Sports Week 2012, is still very different. Previous research states that explosive lower extremity strength abilities for taekwondo athletes are essential (Biao & Yuwen, 2022). Taekwondo athletes must have good-quality leg muscle strength to achieve maximum performance results.

Having good leg muscle abilities for a taekwondo athlete is beneficial during a taekwondo game, such as doing sidekicks, jumping kicks, or quick and strong kicks when taking half an attack. (ARAZI et al., 2016). Taekwondo martial arts is known for performing fast and high-kicking techniques which require a high level of strength and speed. Therefore, muscle function controls the lower limbs in launching explosive attacks, jumping, and maintaining posture (Haddad, 2014). Another study said taekwondo athletes must train regularly to get fast and strong kicks. Athletes must do this so they can experience an increase, especially in explosive power or good leg muscle strength. This training is also necessary because leg muscle strength is the main component in producing fast and strong kicks

(Fakhruddin et al., 2020). *Taekwondo martial arts* is a sport characterized by performing high kicks, twisting movements, and kicking quickly during body contact, where an athlete aims to attack an opponent with maximum strength (Zarei et al., 2020). Prioritizes using dynamic kicking techniques from various directions with solid movements. To obtain maximum speed, strength, and dynamic body posture control, an athlete expects the maximum body posture and needs to improve muscle performance and the neuromuscular system (Jlid et al., 2016). Taekwondo competition is a combat sport with constant interaction and opposing goals between opponents and uses complex kicks and powerful movements (De et al., 2016). Carrying out offensive or defensive actions, the performance of kicking movements depends on the strength of an athlete (Estevan, n.d. 2017). An athlete needs explosive muscle strength, the ability to generate force, high movement speed, acceleration, and strength to succeed in a competition (Java, 2021).

Taekwondo is a combat sport involving high-intensity performance over a short period and is separated by low-intensity or passive performance (Lopes-silva et al., 2018). Efforts to succeed in a taekwondo match require explosive muscle strength, the ability to produce force, high acceleration speed of kicks, and strength (Alp & Gorur, 2020). High-intensity strengthening exercises support training in the combat sport of taekwondo to support the physical condition of each athlete. High-intensity training is a form of exercise carried out at an intensity above 80% of the maximum heart rate (Marzuca-nassr et al., 2020). Training program planning must match a training model, including frequency, volume, intensity, training design, the ratio between work and rest, type and training method, and repetition rate (Kilen et al., 2020). Excellent physical fitness is required to perform well in a taekwondo match. The quality of an athlete's physical condition is essential for all athletes.

Several components of physical condition that must be possessed and follow the characteristics of taekwondo martial arts include anaerobic endurance, muscle strength and endurance, explosive power, agility, flexibility, reaction speed, and cardiorespiratory or aerobic endurance (Gunawan, 2021). Another study stated that the factors influencing the quality of physical condition in male and female athletes are reviewed from the results of speed, power, and strength ability tests and measured from the upper and lower body. Trainers do not only provide one type of training to improve the quality of an athlete's physical condition. It is highly recommended to train an athlete based on the needs of the biomotor component of physical condition in each sport (Nugroho et al., 2021). Muscle strength is needed to gain strength against external resistance in taekwondo martial arts with fast kicks and maximum strength. Furthermore, muscle endurance is the muscle's ability to resist fatigue at any time. Power is needed to perform movements quickly with maximum strength (Gunawan, 2021). Research reveals that athletes who are successful at the national level can be categorized as athletes with less body fat, taller posture, better aerobic capacity, explosive power, and agility. The number of hours of training a taekwondo athlete does affect the isokinetic muscle ability and strength of the quadriceps and hamstrings at fast speeds but not at slow speeds (Nikolaidis et al., 2015). *Leg muscle explosive power* is an ability that plays a role in channeling strength in a short time when providing direction at the best opportunity with one complete explosive movement to achieve the goal (Fitrah Azzannul, 2019). Technically, explosive power is the muscle's ability to exert maximum strength in a short time to achieve the desired goal (Sovia wahyuni, 2020).

Having good power abilities is one of the needs that a taekwondo athlete must meet. Having good power is very profitable in the game of taekwondo. In taekwondo matches, power functions to gain points. With the minimum level of kick power that an athlete must produce, power plays an essential role as a biomotor component that taekwondo athletes must have (Abdulloh Bagus Haqi, 2020). Physical condition is an important part of athlete achievement that needs to be considered when preparing the training program. Physical condition is the basic foundation for improving other factors in an athlete's successful performance (Welis, Wilda, 2019). Success in achieving achievements is through physical condition development, carried out in a planned, regular, and continuous manner (Mulia et al., 2018). In developing physical conditions, there is physical training as a support to achieve a higher level of

performance by improving the athlete's training structure, combining physical skills, planning and knowledge, and psychological elements (Bashar & Yaseen, 2019).

Many factors can influence an athlete's success during a game. The main factor that needs to be prepared for a taekwondo competition is an athlete's physical ability. A successful athlete results from many important factors, such as physical training, skills, technique, determination, strategy, and psychological readiness. In achievement training, it is necessary to prepare and plan a training periodization program that is structured and designed to meet the performance needs of athletes during competition. PORDA Sleman taekwondo athletes' physical quality results are far from the physical quality standards to support athlete performance during competitions. This becomes evaluation material for coaches to create exercises that can effectively and efficiently improve the physical quality of athletes. In the future, it is hoped that coaches will be able to design training programs that cover the physical standard needs of athletes during competitions that are carried out well and safely so that athletes do not easily get injured.

Conclusions

Based on the assessment in this research, the power quality of Sleman taekwondo athletes, both male and female, is still far from the *good* category. Physical condition and training are very important for the performance and success of taekwondo athletes. This study emphasizes the importance of assessing and improving the physical attributes of taekwondo athletes, such as strength, agility, and explosive power, through specialized training programs.

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