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Effects of Half Squat Training on Dollyo Chagi Kicking Skill of Taekwondo Athletes

Muhammad Rusli*, Marsuna, Jud, Sariul
Universitas Halu Oleo, Indonesia

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Abstract

Half squat is a strength exercise to improve the ability of the pelvic and thigh muscles by standing straight with the feet shoulder-width apart and the toes facing slightly outward to maintain balance. When the knees bent and the hips lowered, the knees are not going beyond the toes. This study was aimed to determine the effect of half squat training on dollyo chagi kicking skill of Taekwondo athletes. This study used an experimental method using a one group pre-test post-test design. The population of this study were all 20 members of the Kendari City Taekwondo Club. The total sampling technique was used to select the samples. From the results of the data analysis, the pre-test score was 25.95, while the post-test score was 30.35. Based on the results of data analysis, the effect of half squat training on the dollyo chagi kicking skill of Taekwondo athletes was proven significant, as indicated by the t-test value of $0.000 < 0.05$. Based on the results of data analysis, the half squat exercise had a major impact on the ability of Taekwondo athletes to perform dollyo chagi kicks. In addition, the half squat exercise had an effect on increasing the athlete leg muscle power because it was carried out in a programmed exercises repeatedly so that the results of the skill could be maximized as expected.

✉ Correspondence Address : Anduonohu, Kota Kendari, Sulawesi Tenggara 93232
E-mail : muhrusli@uho.ac.id

INTRODUCTION

Training can improve an athlete ability to excel at both national and international levels (Freitas et al., 2022) and it has been shown to improve an athlete fitness and physical components while training (Fachrezzy et al., 2021). The training conducted should adhere to a meticulously crafted program that is tailored to the specific requirements of the athlete, with the objective of enhancing their capabilities in engaging in systematic training (Nasrulloh, 2012). One of them is the martial art sport named taekwondo. Taekwondo, being one of the most widely practiced sports globally, is often organized through events that aim to promote accomplishments and foster a beneficial influence on practitioners of this martial art. These events are designed to integrate taekwondo enthusiasts into formal extracurricular activities, as the attainment of achievements in this sport is typically facilitated through early-age coaching (Ihsan & Dewi, 2017).

Taekwondo is a martial art sport whose aim is to attack an opponent using maximum strength (Zulkarnain et al., 2021). The implementation of this self-defense technique can be achieved by a regular and focused training, regardless of whether it is undertaken by novice individuals or more experienced practitioners with prior experience in self-defense (Tan & Krasilshchikov, 2015). In order to attain success in this discipline of martial arts, it is imperative to maintain physical fitness, as it plays a crucial role in bolstering one technical, tactical, and mental skills. The techniques employed in taekwondo use the hands and feet and are self-disciplined in their implementation so that they can be good for the athlete body condition. The acquisition of kicking skills is crucial in this martial art due to its potential to enhance an athlete muscle explosive capacities (Fitri et al., 2015).

Taekwondo implementation system from athlete competition sessions will exhibit improved efficiency in producing attacks, so enabling them to attain greater scores and ultimately secure victory. Victory will not be obtained if the strategies used are ineffective, hence the key focus in gaining victory is a competitive spirit with great commitment (Antonietto et al., 2022). The dollyo chagi kick is a frequently employed technique in taekwondo, known for its effectiveness in securing victory. This kick serves as a vital element in an athlete performance, significantly impacting their chances of achieving success in a match. This strategy is used to attack and defend against an opponent attack (Zulman et al., 2021). The dollyo chagi kick is a rotating oblique kick that attacks the head and stomach by drawing force from the back of the leg (Tsania et al., 2022).

The act of kicking relies on the activation of leg muscles as a propulsive mechanism (Basri et al., 2021). The technique commonly referred to a roundhouse kick is widely employed by practitioners of various martial art disciplines. The roundhouse kick is a rotational motion generated by the pelvis, resulting in a circular trajectory that can be observed from both the outside and the inside, as well as from vertical and horizontal orientations, when countering an opponent attack (Reginald et al., 2021). The dollyo chagi kick can also be performed in a circular motion, with the strike landing on the top of the foot and the target on either the right or left side of the body. During a match, this kick frequently results in points for athletes (Santika & Prananta, 2022). The dollyo chagi kick utilizes a whipping motion that originates from the knee and extends towards the waist, resulting in a powerful kick. This technique can be employed for both defense and attack during a match (Juniar, 2019; Paramitha et al., 2020; Har, 2020). The efficacy of kick training is significantly impacted by the level of force generated by individual athletes (Moreira et al., 2021).

To improve the ability to kick dollyo chagi in taekwondo, endurance training is also needed (Ojeda-Aravena et al., 2021; López-González et al., 2018). One of them is through half squat exercises, which is employed to impart resistance to the muscles of the lower leg (da Silva Santos et al., 2016). The half squat exercise is done by placing both feet on the floor, lifting the weight as high as possible, and then lowering it to the starting position with the knees slightly bent (Latuheru, 2020). This exercise is to be done repeatedly (Jiang et al., 2021). The primary objective of this training is to enhance muscle strength and improve reaction speed. This training involves a series of continuous exercises that have a direct influence on the augmentation of muscle strength. The specific focus of these exercises is to enhance muscle power in the lower extremities (Wiratama et al., 2021). The concept of explosive power, as described by Nasrulloh et al. (2021), pertains to the amalgamation of strength and speed in order to attain optimal levels of power.

According to Nasrulloh et al., (2020), engaging in exercise three times per week at an intensity level ranging from 70% to 80% has the potential to enhance muscle capacity through repetitive implementation. The study conducted by Yilmaz et al. (2022) suggests that an eight-week training program can significantly impact the dollyo chagi kicking proficiency of athletes. Pérez-Castilla et al. (2020) assert that the incorporation of half squat training significantly impacts the outcomes achieved in sports activities involving resistance training of varying intensities, aimed at increasing kicking speed. Li et al. (2021) assert that the half squat exercise places emphasis on the body when executing squats, necessitating adjustments to the knee joint condition with degrees of freedom both in abduction and rotation during the activity. Hence, the objective of this study was to investigate the impact of half squat training on the dollyo chagi kicking proficiency of athletes practicing taekwondo martial arts.

The half squat exercise is a type of strength training that is frequently used to strengthen the pelvic and thigh muscles. However, not much is known about the effect of Half Squat training on the dollyo chagi kicking ability of taekwondo martial art athletes. According to Chaabene et al., (2018), half squat training can improve the dollyo chagi kick ability in taekwondo martial art athletes. The results of this study showed that athletes who did half squat training for 6 weeks experienced a significant increase in their dollyo chagi kicking ability.

This study has the potential to significantly improve the performance of taekwondo athletes. Dollyo chagi is an important skill in taekwondo. Developing this kick aptitude can help athletes perform better in competition. Exercise of strength, such as half squat, can assist strengthen leg muscles, which can help prevent injuries in taekwondo players (da Silva Santos et al., 2020). Injuries often become major impediment to an athlete career and proper training can help lessen the risk of injury. Through this research, it is expected that the most effective half squat training techniques can be identified to provide valuable guidance for coaches in developing better training programs for taekwondo athletes.

This research contributes to the field of sports science and the development of better training methods. The results of this research can be used as a basis for further research in improving an athlete performance in various sports. Athletes may feel more motivated to train harder if they have scientific evidence that half squat exercises can improve their kicking ability. This can also help increase discipline in their practice. For teams or countries involved in taekwondo competitions, having athletes who have undergone effective half squat training can provide a competitive advantage in tournaments. The results of this research can be used to direct training programs for young athletes who want to develop their dollyo chagi kicking abilities early. This initiative has the potential to facilitate the cultivation of emerging talent within the field of taekwondo.

The ability to kick dollyo chagi improves as a result of half squat training, which strengthens the pelvis and thigh muscles that are essential for completing these kicks. Aside from that, half squat training can help players improve their stability and balance, allowing them to execute kicks with more precision and accuracy. This study added to the body of knowledge about the benefits of half-squat training for enhancing dollyo chagi kicking ability in taekwondo athletes. Taekwondo athletes and coaches might consider including half squats in their training routine to effectively improve their strength and kicking proficiency. It is important to note, however, that relying just on half squat training may not yield optimal improvements in kicking skills. In addition to adhering to proper form and consistency, athletes are required to engage in targeted kicking drills and techniques.

METHODS

This study used an experimental method with a one-group pretest-posttest design. The research design employed in this study was a comparison between the condition prior to treatment and the condition subsequent to treatment (Sugiyono, 2015). The validity test for the pretest and posttest instruments yielded a coefficient of 0.625, indicating a statistically significant relationship ($p < 0.001$) below the conventional threshold of 0.05. Additionally, the reliability test for the pretest and posttest instruments resulted in a coefficient of 0.760.

Participant

The participants of this research were all twenty members of the taekwondo club who actively participated in training.

Sampling Procedures

The sampling technique employed in this study was total sampling, which involved the inclusion of the entire population as the sample. The sample consisted of 6 female and 14 male athletes who were actively engaged in training. Consequently, the overall sample size for this research was 20 athletes.

The characters of the research subjects were different, but there were certain general characteristics that could be described, namely discipline, independence, physical strength, concentration, technique, leadership, and motivation. Taekwondo athletes, both women and men, are expected to have a strong sense of discipline in their training and preparation. Strong discipline can help them stay focused and keep preserved in their training even in difficult situation. As athletes, they are also expected to be independent in training and developing their abilities. They must be capable of taking the initiative to choose the best strategy to improve their performance. Aside from that, taekwondo athletes must have sufficient physical strength to carry out the movements and techniques required in taekwondo. Concentration is also important in this martial art, especially when competing. Female and male athletes must be able to focus on their tasks without being distracted by distractions. Taekwondo athletes must have good technique in carrying out movements and kicks. They must master basic taekwondo techniques and use them well in matches. As a taekwondo athlete, you must be a role model and leader for your teammates and the next generation. Good athletes can inspire and motivate their teammates to improve. A taekwondo athlete must have a strong never-give-up spirit when facing challenges and failure. They must be able to recover from defeat and strive to improve their performance.

Materials and Apparatus

The tools used in examining the dollyo chagi kicking ability were a stopwatch, test form, and stationery (Fian, 2007).

Procedures

An initial test was performed, followed by continuous half-squat training three times a week for 18 meetings (Bogdanis et al., 2011), and a final test to determine the improvement in dollyo chagi kicking skill in the Taekwondo athletes. The half squat training form can be seen in Figure 1.

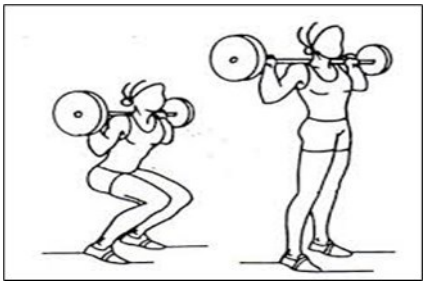

Figure 1. Half Squat Training Form

The maximum performance of half squat training conducted three times per week was achieved 17 times, with a specific number of sets: 1) moderate 70% for 3 sets, 12 repetitions with a weight of 7 kg, 2) heavy 80% for 4 sets, 14 repititions with a weight of 8 kg, 3) light 60% for 5 sets, 10 repititions with a weight of 6 kg. The exercise protocol involved incorporating a 1:2 rest ratio between repetitions, as well as a rest period of 2 to 3 minutes between sets.

The procedure for executing a dollyo chagi kick in the taekwondo practice involved the following steps: the athlete executed kicks according to the height of target aiming for the designated target area up to epigastrium as the limit (moumtong) which varies according to each athlete height. The recorded kick must be loud and precise, lasting 30 seconds. The collected data pertained to the quantity of accurately executed kicks completed within a time frame of 30 seconds.

Design or Data Analysis

Prior to conducting hypothesis testing, prerequisite testing was required. The examination of measurement data that was associated with research findings aimed to improve the process of analysis. Consequently, this study aimed to assess the normality and homogeneity of the data. The objective of the normality test is to verify that the data being investigated followed a normal distribution. The Kolmogorov-Smirnov test in SPSS 20 was used to determine whether the data distribution was normal. The test examined the distribution of data derived from a normally distributed population to determine the acceptance or rejection of the hypothesis. It was necessary to compare the significance level (Sig) with a threshold value of 0.05. If the significance level (Sig) exceeded 0.05, the null hypothesis could be accepted. A hypothesis could be deemed invalid if it failed to satisfy the specified criteria.

RESULT

The results of the pretest descriptive analysis of dollyo chagi kicking ability in taekwondo athletes using half squat training obtained a maximum score of 36, a minimum score of 18, a range of 18, a standard deviation of 3.940, a mode of 22, a median of 25.50, and a mean of 25.95. Meanwhile, the post test score obtained a maximum value of 40, minimum value of 24, a range of 16, a standard deviation of 3.703, a mode of 29, a median of 30.00, and a mean of 30.35. The results of the descriptive test show an increase in the posttest, implying that half squat training had a substantial influence on the dollyo chagi kicking skill of taekwondo athletes. The pretest and posttest frequency distribution tables show data on the development of kicking ability.

The data normality test in SPSS version 26 was employed to ascertain whether the data was normally distributed and came from a population with a normal distribution. By examining the significance of 0.05 at the 95% confidence level, the researcher could determine whether the data hypothesis was accepted or rejected. If significance was greater than 0.05, the hypothesis was accepted. The hypothesis was rejected if the requirements were not met. The following are the results of the normality test for each data are shown in Table 1:

Table 1. The Normality test

Variable	Statistic	Sig.	P	Note
Pretest	0,108	0,310	0,05	Normal
Posttest	0,112	0,350	0,05	Normal

Table 2. The Homogeneity test

Variable	F	*p*	Note
Pretest	35,296	0,05	Homogeneous
Posttest	55,379	0,05	Homogeneous

Table 3. T-Test Analysis

Variable	t	df	Sig.
Pretest	3,66	19	.000
Posttest			

The data from the pretest variable of the dollyo chagi kicking skill in taekwondo athletes was 0.310 and data from the posttest variable was 0.350. The results of the normality test show that both variables had a significance value greater than 0.05, indicating that the data were normally distributed. This conclusion could be used as a prerequisite to proceed to the t-test, which requires the data to be normally distributed and homogeneous. The homogeneity test relies on research data from a homogeneous population. It is feasible to assess if the hypothesized data are accepted or rejected by comparing the significance (sig > 0.05). The results of the homogeneity test are shown in Table 2.

Based on the homogeneity test results, the pretest data for the dollyo chagi kicking skill of participants was 35,296, while the posttest data was 55,379. This study could be considered homogeneous as the data value exceeded the threshold of 0.05. The impact of half squat training on the dollyo chagi kicking skill of taekwondo athletes was assessed by the t-test outcomes. The t-test value was 0.000 < 0.05, indicating that there was a significant difference between the pretest and posttest data, as shown in Table 3.

DISCUSSION

The basic movements of taekwondo are punches and kicks. A forceful and rapid strike executed with the foot is referred to a kick. The dollyo chagi kick is a rotational kick directed towards the abdominal region of the target, executed with an angular trajectory or a twisting motion. The kicking technique discussed in this study integrates physiological paradigms and morphological principles. It primarily involves utilizing the pads of the feet, while also incorporating the instep as a contributing factor in executing dollyo chagi in the context of taekwondo (Rizki, 2019). This study used half squat training to improve taekwondo kicking skills, notably one of the most difficult kicking techniques in taekwondo. The performance of this technique needs maximum strength, which can be aided by the use of knee whipping and waist rotation. These extra actions increase the range and effectiveness of the kick while also encouraging better coordination. Several parts of the human body, particularly the waist, have an important role in generating explosive movements that

allow individuals to anticipate and respond to their opponents, according to Setiawan et al. (2018).

Half squat training plays an important role in increasing the overall ability of sport techniques, because training is carried out with repetition and systematic actions so that it can improve an individual ability (Krčmár et al., 2015; Gonzalez-Rave et al., 2021). Half squat training is primarily designed to strengthen the muscular power of an athlete lower extremities. It is essential to ensure that the legs possess the necessary physical capacity to do this training, since they play a crucial role in executing kicking movements. Consequently, enhancing the muscular capacity of the lower extremities represents a viable approach to enhancing the proficiency of taekwondo athletes in executing the dollyo chagi kick (Heriansyah & Suhartiwi, 2021). Research results show that half squat training can increase power, especially in the leg muscles, which can improve athlete performance during the match. If a taekwondo athlete can train the technique when competing, when performing dollyo chagi kicks on their opponent, he or she will be able to develop physical abilities. This is because the better the strength of the leg muscles used when kicking, the better the dollyo chagi kick will be (Ariansyah et al., 2017).

A good kick is characterized by its rapid execution, substantial force, precise targeting, and proficient coordination of movement, hence rendering it challenging for the opponent to successfully deflect or counter. According to the findings of the research, it has been observed that the Dollyo Chagi kick is the most frequently performed attack in taekwondo matches. Because it is very easy to learn and train compared to other kicks, many taekwondo athletes use the dollyo chagi kick in competition. In order to score point, the dollyo chagi kick must successfully make contact with the designated target area and make contact with the electric body protector, electric headguard, and foot sensors (Pamungkas, 2021). There are numerous additional exercises that require further research than the half-squat training that influence the skills of the dollyo chagi kicker. The quality of an athlete motor coordination skills is also an important factor in the movement execution. An athlete, for example, needs other physical components to enable movement when doing one kick. Today competitions are more focused on the kicks successfully activating the sensors on the opponent body armor than on the movement. The kicking force must be precise to activate an accurate kicking sensor.

A related research to the present study was conducted by Tsania et al., (2022), entitled the influence of 50 meter sprint training on increasing the speed and strength of dollyo chagi kicks in taekwondo athletes. The difference between the research and this study is the training method used, which used a 50-meter sprint training, whereas this study used half-squat training. However, it is noteworthy that both research endeavors yielded comparable outcomes, as they effectively enhanced dollyo chagi kicks in athletes, despite the divergence in training methods. Paramitha et al., (2020) conducted more research under the heading research on the influence of flexibility training on the accuracy of dollyo chagi kicks in taekwondo and pencak silat. All research examined the improvement of kicking skills using various training methods.

Based on the findings of prior studies, it can be inferred that the research employed diverse techniques and shown a noteworthy correlation between the two variables in enhancing the efficacy of dollyo chagi.

CONCLUSION

Based on the findings derived from data analysis, it is evident that half squat training has a significant impact on the ability of taekwondo martial art athletes to perform dollyo chagi kicks. Half squat training exerts a substantial impact on improving the athlete leg muscle power, owing to its systematic and repetitive training regimen. Consequently, this training approach yields optimal outcomes in terms of maximizing the athlete kicking skill, aligning with initial expectations.

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