International Seminar on Student Research in Education, Science, and Technology
ISSN 3047-1532 | Volume 1 April 2024, pp. 526-532

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Universitas Muhammadiyah Mataram, Indonesia

The Influence of Power, Flexibility, and Balance on Elgol Dollyo Chagi Kicks in Male Athletes Aged 18-24 years at PORPROV XIV Taekwondo West Java 2022

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Abstract: This study carried out on elite athletes from West Java Province to analyze the physical performance of elite athletes, namely power, flexibility and balance on the accuracy of their dollyo chagi kicks on these three physical performance. In two previous studies, it was known that physical performance profile had influence on the psychology and physiology of athletes. Therefore, this research aims to provide reference material for non-elite taekwondo athletes to determine the physical performance profile of elite athletes so they can excel and achive targets in national and international competitions, especially for athletes with peak age of performance according their LTAD age, namely 18-24 years. The research method used in taking the test uses the development method and the random sampling technique as sampling technique. A sample of 45 people took the Standing Board Jump Test for leg muscle explosive power, the v-sit and reach test for flexibility test, and a balance test using a wooden balance board. The statistical analysis technique uses multiple linear regression techniques with degrees of freedom t table (df) = 45 at a significance level of 0,05. The calculation obtained the average frequency of kicks was 37.09 kicks using the right foot and 37.16 kicks using the left foot in 1 minute. From the results of the T-test, the significance value for strength (0.738) and balance (0.271) is smaller than 0.05 but the significance value for flexibility is 0.04, which means that H1 for the variable flexibility is accepted but H1 for power and balance is rejected. Based on the results of the F-test, the Sig. 0.195>0.05; So power, flexibility, and balance do not have a simultaneous effect on Elgol Dollyo Chagi's kick in male athletes aged 18-24 years at PORPROV XIV Taekwondo West Java 2022.

Keywords: power, flexibility, balance, taekwondo, dollyo chagi

Article History:
Received: 25-03-2024
Online : 09-04-2024

A. INTRODUCTION

Sport is a physical activity that can be done by all groups of people to get physical fitness. Sport is a form of physical activity contained in games, competitions and intensive activities in order to obtain the relevance of victory and optimal achievement. (Li et al., 2020)The Korean martial art Taekwondo has been an official Olympic sport since the 2000 Sydney Olympics. Taekwondo is a full contact combat sport where the majority of successful techniques are powerful kicks, which are delivered by hitting the opponent's chest gear or the head(Casolino et al., 2012). In a condition of prime fitness, a person needs to do physical exercise which involves physical condition with the correct exercise method (Bompa & Buzzichelli, 2019). The components of physical condition according to Satojo are: strength, endurance, explosive

power, speed, flexibility, agility, coordination, balance.), accuracy (accuracy), and reaction (Widiastuti, 2017). Physical performance that is different from other sports probably comes from the wide age range of performance of Olympic athletes (Longo et al., 2016).

At the 2012 London Olympics, the men's lowest weight category, namely under 58kg between Joel Gonzales Bonilla (ESP) and Lee Dae Hoon (KOR), was won by Joel Gonzales Bonilla with a score of 17-8. The 17 points in detail resulted from 7 momtong dollyo chagi kicks, 2 elgol dollyo chagi kicks, 1 punch, and 3 points from kyonggo (mistakes made by Lee Dae Hoon. Meanwhile, Lee Dae Hoon got 8 points from 7 momtong kicks dollyo chagi and 1 kyonggo. All the kicks or 2 elgol dollyo chagi kicks that Bonilla executed were kicks that were on target and were effective in producing 6 points, but 22 of the 41 dollyo chagi momtong kicks or only 32% of the kicks were on target. Another case with the heaviest class in the men's category at the 2016 Rio Olympics, namely over 80 kg. The match between Abdoulrazak Issoufou Alfaga (NIG) and Radik Isaev (KAZ) was actually won by the Kazakstan athlete with a final score of 2-6. Alfaga was able to perform 18 momtong kicks dollyo chagi and 18 elgol dollyo chagi kicks but none of them were effective in producing points. Meanwhile, Isaev did 10 momtong dollyo chagi kicks although none of them were on target and 1 of 2 elgol dollyo chagi kicks managed to score points.

The results of these two analyzes show that body weight class will influence the intensity of kicks performed by taekwondo athletes. Likewise with the effectiveness of these kicks in generating points in each weight class (Costa et al., 2018). The number of kicks performed also experienced a significant difference between the men's and women's lowest weight classes at the 2020 Tokyo Olympics, female athletes performed more kicks than men but their effectiveness was low. This can be caused by the amount of flexibility, explosive power and balance of the kick which are influential. Differences in gender, competition class and age will be factors that cause differences in the effectiveness value of the dollyo chagi kick which is caused by the intensity and accuracy of the kick.(Kil, 2006).

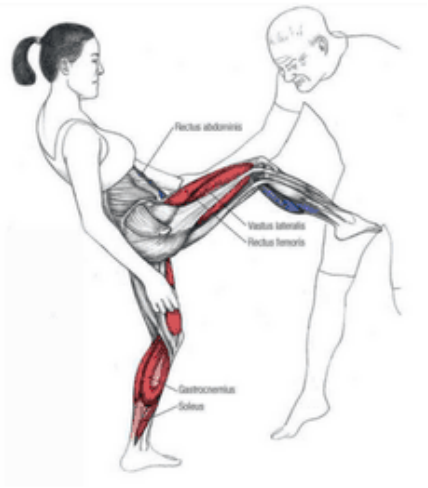

Figure 1. Muscles that work when Dollyo Chagi kicks meet the target

Figure 2. Muscles that work when Dollyo Chagi kicks doesn't meet the target

In previous research conducted research entitled Physical, physiological and psychological profiles of elite Turkish taekwondo athletes in 2020, they conducted research on explosive power, agility, flexibility, reaction speed and balance using the vertical jump method for explosive power, sit and reach for flexibility, and running on a treadmill for a balance test (Khayyat et al., 2020). The findings of this research reveal the physical, physiological and psychological characteristics of taekwondo. Test results can be useful for assessing the performance of taekwondo players. In the research Identification of elite performance characteristics in a small sample of taekwondo athletes conducted by (Wazir et al., 2019), they conducted anthropological tests and 6 physical performance tests for elite and non-elite athletes as well as three coordination tests for adolescent athletes. This research confirms that knowledge about the physical performance of elite athletes will develop along with their coordination (Mikaelsson et al., 2020).

Taekwondo sport requires excellent physical condition, this is due to the high intensity of movement in carrying out each movement technique and one of the physical conditions that must be possessed is balance (Cho et al., 2013). In an effort to improve the balance of taekwondo athletes, it is necessary to have a structured and programmed training program (Cvecka et al., 2015). Good balance is very important for effective defense and defense positions for taekwondo athletes with good balance can better avoid opponent attacks and quickly adapt to counter effective attacks on opponents (Barrera et al., 2020). From some literature found that balance is needed by taekwondo athletes in carrying out attacks against opponents (Naul & Hardman, 2005).

Research on physical performance conditions and comparisons between elite and non-elite athletes in two previous studies has developed knowledge about physical performance and elite athletes but still has not confirmed the existence of physical performance in elite athletes and the ease of research tools used in each study (MacIntyre et al., 2017). This research was conducted on elite athletes from West Java Province regarding the accuracy of their dollyo chagi kicks in this study. Therefore, this research aims to be a reference material for non-elite taekwondo athletes to determine the physical performance profile of elite athletes so they can

excel and achieve targets in national and international competitions, especially for athletes at their peak age of performance according to their LTAD age.

B. METHOD

The research method used in this research is a development method that takes samples from the entire population of elite athletes use random sampling technique takes 45 of 75 peoples sourced from 6 cities and districts in West Java, namely Depok City, Bogor City, Bandung City, Bekasi City, West Bandung Regency, and Bogor Regency.

1. Standing Board Jump

Standing Board Jump is a form of fitness test method that is commonly used to determine the power of a person's leg or foot muscles or the explosive power of a person's leg muscles (France, 2009). The higher or further the jump, the stronger the leg muscle power or explosive power of an athlete (Wahyudi, 2018)The purpose of this test is to determine and measure explosive power or leg muscle power. The assessment is taken from the furthest number of the 3 jump attempts achieved by the sample (Thomas et al., 2015).

2. V-sit and reach test

The flexibility test in the leg muscles is using the V-sit and reach test instrument. This instrument was used because it was considered more efficient for a sample of taekwondo athletes who needed flexibility, especially in the hamstring muscles to create high kicks (Solissa & Tangkudung, 2015).

3. Balance board test

Balance test participants will be tested with the Balance Board Test instrument. This instrument is used because the sport of taekwondo is dominated by dynamic balance movements (Cho, 2014). The assessment is taken from the number of 3 test attempts achieved by the sample. With the three instruments above, the total number of dollyo chagi kicks, both momtong dollyo chagi and elgol dollyo chagi kicks, will be compared for each 1 minute. The test was analyzed using SPSS 23.0 software, descriptive analysis involves calculating the mean and standard deviation.

C. RESULTS AND DISCUSSION

1. Classic assumption test

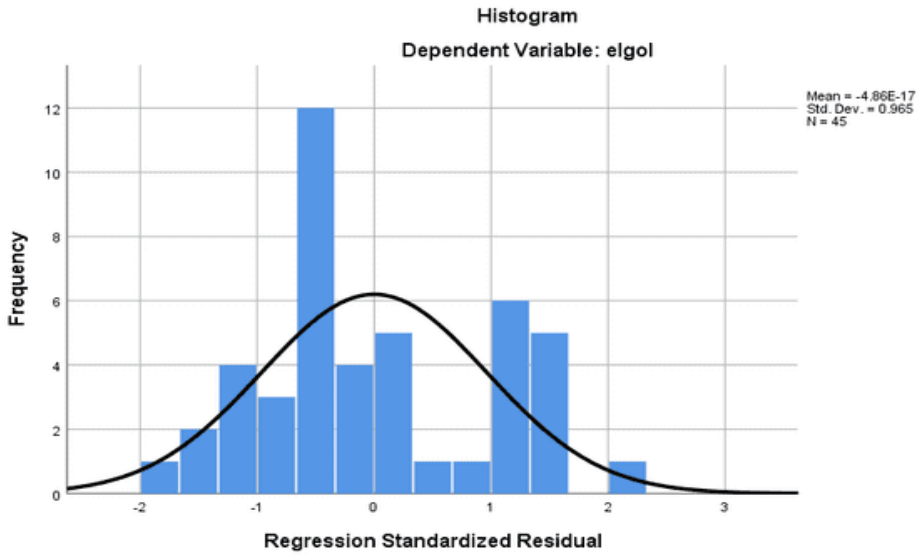

Figure 3. Normality Test

The results of the histogram normality test produce a mountainous curve, so it can be said that the pattern is normally distributed. The results of the P-Plot normality test produce a diagonal line, so it can be said that the pattern is normally distributed.

Table 1. T-test table

No	Model	tolerance	VIF
1	Constant	.990	1.010
2	Power	.993	1.008
3	Flexibility	.984	1.016
4	Balance	.990	1.010

Power collinearity value: 0.990 > 0.100 ; Flexibility collinearity value: 0.993 > 0.100; Balance collinearity value: 0.984 > 0.100. Conclusion: there are no symptoms of multicollinearity for each variable power (X1), flexibility (X2), and balance (X3).

2. Test Using Primary Data

a. T-test

Table 2. T-test table

No	Model	t	Sig
1	Constant	2.369	.023
2	Power	.337	.738
3	Flexibility	1.984	.054
4	Balance	1.115	.271

The partial T-test result is the Sig value. variable power (X1) 0.738 > 0.05, then power (X1) has no effect on Elgol Dollyo Chagi's kick (Y). Sig value. the flexibility variable (X2) is 0.05 < 0.05, then flexibility (X2) has an effect on Elgol Dollyo Chagi's kick (Y). Sig value. balance variable (X3) 0.271 > 0.05, then balance (X3) has no effect on Elgol Dollyo Chagi's kick (Y). The results of the T-test using multiple linear regression techniques are the value Tcount>Ttable. The t-table value is (α/2; n-k-1) = (0.025; 45-3-1) = (0.025; 41) = 2.020.

b. F-test

Table 3. F-test table

No	Model	Mean	f	Sig
1	Regression	163.461	1.640	.195[b]
2	Residual	99.657		

Sig value. 0.195 > 0.05, then power, flexibility and balance do not have a simultaneous effect on Elgol Dollyo Chagi's kick.

D. CONCLUSIONS AND SUGGESTIONS

In this section the author details the conclusions of the results of the discussion and data analysis and is advised to submit further research to the next researcher.Based on the output value of several tests, including the Test for Equality of Variance, which is 0.365 < 0.05, it can be interpreted that the data variance between the right and left momtong dollyo chagi kicks is homogeneous. Based on the "Independent Samples Test" output table in the "Equal variance assumed" section, the sig value is known. 2 tailed is 0.965 > 0.05, thus it can be concluded that there is no significant difference between the average momtong dollyo chagi kick using the right or left foot. Based on the research results, there are several factors that might influence the dollyo chagi kick. Physical performance is not only power, flexibility and balance, but there is still agility and coordination which can be added to the test variables in future research. Other psychological and physiological factors will also be other factors that influence the results of the research.

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