



CORRELATION BETWEEN AGE, HIGH, WEIGHT, AND FLEXIBILITY OF MAE GERI ABILITY ON KARATE JUNIOR ATLET OF DOJO PUSAKA DENPASAR

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ABSTRACT

This study aims to determine the relationship between flexibility and the ability of mae geri (straight kick). The population of this research is 37 junior karateka of Dojo Pusaka Denpasar who are male and aged between 16-20 years. 24 people were selected from this population.

Determination of the sample is done by total sampling technique. The method used is descriptive method with a correlational approach. Data collected were age, height, weight, flexibility and a 15-second mae geri test to measure the ability of the mae geri. The data obtained were analyzed with Pearson correlation followed by multiple regression at the significance level $\alpha < 0.05$. The results of the data analysis showed that there was a significant relationship between flexibility in the ability of the mae geri with the value of $r = 0.696$ and $p = 0.000$, while age, height, and weight were not related to the ability of the mae geri. The simultaneous correlation between age, height, weight, and flexibility was significantly related to the ability of the mae geri with $r = 0.780$ and $p = 0.001$. Age, height, weight, and flexibility give an effect of 60.9% on the ability of the mae geri. This means that the ability to mae geri kick depends on flexibility.

KEYWORDS: flexibility, ability of mae geri, karate.

INTRODUCTION

Karate is a martial art using legs and bare hands. This branch of martial arts from Japan is very popular with various groups and has been contested in world championships and the Olympics. Karateka can achieve maximum results by training the legs and arms. The goal is

to be able to overcome surprise attacks from opponents. The attack can be well controlled by karateka who have optimal physical conditions.

The achievement of a karateka is determined by various factors including age, height, weight, physical characteristics, measured and programmed training by applying sports science and technology as well as environmental factors. Factors of prime physical condition during the match are needed to be able to carry out attacks on opponents quickly and precisely (Astrand and Rodahl, 2003). Environmental factors also cannot be ignored, such as air temperature and relative humidity, altitude, wind direction and speed and audience factors (Sandi, 2014; Sandi et al, 2017; Sandi and Parwata, 2018; Andriana et al, 2019).

High temperature and relative humidity of the air will accelerate the expenditure of body fluids to accelerate the expenditure of body heat to the surrounding environment. This is consistent with the results of the study of Sandi et al (2017), that 40% relative humidity can inhibit the expenditure of body fluids compared with 50% and 60% relative humidity. A significant difference occurred between 40% relative humidity and 60% relative humidity with a value of $p = 0.002$ ($p < 0.05$). The speed of perspiration will affect the obstruction of blood flow to the part of the body that is working. This will have an effect on increasing body temperature, frequency of exercise pulses, and blood lactic acid levels. The results showed that 40% relative humidity can inhibit the increase in pulse frequency, body temperature, and blood lactic acid levels in exercise (Sandi et al, 2016).

In a karate match, the athlete's victory or achievement is largely determined by the number of attacks that can be nested on the target. The attack can be in the form of mae geri. According to the World Karate Regulations, attacks carried out with punches get a value of 1 (Ippon), whereas attacks carried out with kicks will get a maximum value of 3/Sampon (Merle et al, 1998; Miller, 2002; Martini, 2005).

Not only the speed needed to be able to collect points, but also needed endurance leg muscles and a good arm to be able to release as much as possible. From the results of monitoring on the ground, only 10% of karateka are able to carry out attacks with a straight forward kick, so they don't get perfect results. This condition is caused by lack of physical training in karateka's physical condition, specifically the lack of trained ability of the leg muscles (Chaabene et al 2012; Arsyia, 2013).

Basically, the karate sport requires joint space or flexibility. A person's flexibility is determined by the breadth of joint space. According to Harsono (2008), flexibility is the ability to make movements in the joint motion that is determined by the elasticity of muscles, tendons and ligaments. Furthermore Sandi et al (2020) states that flexibility can be defined as the ability or ability of the body and limbs to make protruding movements in the joints with the widest possible distance. The traditional training method to train flexibility is a dynamic stretch method. Dynamic stretching is usually done by moving the body or limbs rhythmically in a circular motion or reflecting limbs, intended to gradually increase joint space. Besides that, static stretching is also needed, which is a way to develop flexibility with static stretching exercises. In static stretching exercises the performer takes the attitude as comfortable as possible so that it stretches a certain muscle group. This attitude is maintained statically for about 20-30 seconds (Bompa and Haff, 2009).

Athletes who are shaped are athletes who have a wide range of motion in their joints, their muscles are elastic, and the efficiency of movement and maximum energy. This condition is needed by every sport including karate. Considering the importance of the role of flexibility in karate kicks, the relationship between age, height, weight, and flexibility of the ability of the mae geri will be examined.

MATERIALS AND METHODS

This research is a descriptive study with 37 participants of junior karateka on dojo pusaka Denpasar. The approach used to address the research problem is a correlational approach in which the researcher chooses individuals who have variations in the matter investigated, all group members selected as research objects are measured regarding age, height, weight, flexibility, and ability of the mae geri, then the data obtained were tested with Pearson correlation followed by multiple regression. The significance used is $p = 0.05$.

The sampling technique in this study is purposive sampling, carefully chosen and selective which has specific characteristics, the sample taken has special characteristics of the population so that it can be considered quite representative. The characteristics and specific strata are highly dependent on the wishes of the researcher. Samples taken as many as 24 karateka male sex.

The study was conducted simultaneously in the afternoon at 17.00-19.00 in the same place that is at Denpasar Ngurah Rai field, then the research environment data consisting of

ambient temperature, relative humidity of the air, wind speed and direction and altitude were assumed to show the same number.

Measurement of the Determination Test is performed using the Flexometer. The procedure of implementation is (1) the subject from a standing position spread legs to the right and left side as close as possible to the floor, (2) do it slowly to a steady position, (3) after steady researchers are positioned behind the sample and measure using a ruler starting from zero on the floor, (4) This test is carried out three times in a row, the best score of three trials recorded as scores in centimeters.

The level of ability of Mae Geri junior karate of dojo pusaka denpasar is measured by a stopwatch, sandsak, test form, whistle, and stationery. Implementation is rubberek standing behind the sandsack / target as high as 120 cm with one foot resting behind the line as far as 60 cm, when on cue "Yes", karateka do mae geri with the right foot from the back towards the target and return to the starting position by touching the floor behind the line. Then continue playing right for 15 seconds. Implementation is carried out 3 times and the best value is taken. From these results, each game to the target will be given given a value of one.

RESULTS

Research characteristics

The characteristics of the study are: age, height, weight, flexibility, and ability of the students to be presented in Table-1.

Table 1: Research Characteristics Data.

Variable	Minimum	Maximum	Mean \pm SD
Age (years)	15.00	21.00	16.67 \pm 1.58
Height (cm)	159.00	177.00	164.38 \pm 5.02
Weight (kg)	50.00	72.00	54.08 \pm 5.10
Flexibility (cm)	14.00	20.00	17.13 \pm 1.45
Ability of Mae Geri (X/mt)	14.00	26	21.58 \pm 2.98

Note: SD = standard deviation, cm = centimeter, kg = kilogram, x/mt = kick per minute.

Correlation between research variables

Correlation between research variables namely age, height, weight, and flexibility of the mae geri ability. Besides that, the relationship between age and height, age with body weight, age with flexibility, and between body weight and body height are also sought. The results of data analysis using Pearson correlation are shown in Table-2.

Table 2: Correlation between Research Variables.

Dependent Variable	Independent Variable			
	Age	Height	Weight	Flexibility
Mae Geri ability	r = 0.253 p = 0.233	r = 0.101 p = 0.638	r = 0.058 p = 0.802	r = 0.696 p = 0.000

Note: r = correlation coefficient, p = significance value

Besides that, it was also found that there was a correlation between height and age, height and weight, and weight with age with successive values $r = 0.455$ with $p = 0.025$, $r = 0.510$ with $p = 0.011$, and $r = 0.700$ with $p = 0,000$.

Simultaneous correlation between age, height, weight, and flexibility of the ability of the mae geri

The results of the correlation test between age, height, weight, and flexibility of the ability of the students are shown in Table-3. The relationship was analyzed using multiple regression analysis.

Table-3: Correlation Analysis Results between Age (X1), Leg Length, (X2), Weight (X3), and flexibility (X4) of the Mae Geri Ability (Y).

Correlation	r	r ²	p	Contributions (%)
X ₁ .X ₂ .X ₃ .X ₄ .Y	0.780	0.609	0.001	60.9

Note: r = correlation coefficient, p = significance value, % = percent

DISCUSSION

Characteristics of research subjects

From the characteristics of the research subjects, it was found that the mean age of the subjects was 16.67 ± 1.58 years, the average height of the body was 164.38 ± 5.02 centimeters, and the mean of weight was 54.08 ± 5.10 kg. The mean height and weight of the subject are at normal limits for Indonesians at that age. This is consistent with the results of Sandi (2013) research on high school students aged between 15-18 years, mean height 167.24 ± 5.77 and mean weight = 58.18 ± 7.37 kg .

Correlation between research variables

Based on the results of data analysis, age, height, and weight were not directly related to the mae geri ability. This is probably due to height, age and weight of the subject is not much different. Other data obtained is that there is a correlation between height and age, and weight and age. These three variables are of course correlated with each other considering all

subjects are still at the stage of growth, where an increase in age will be followed by an increase in height and weight.

Whereas flexibility is directly related to the ability of the students, with the correlation coefficient $r = 0.698$ and $p = 0.000$ ($p < 0.05$). This shows that flexibility plays an important role in determining the ability of the mae geri kick in junior karateka of Dojo Pusaka Denpasar. The positive correlation shows that the more flexibility, the more ability of the mae geri and the less the flexibility, the more the ability of the mae geri.

The explosive power of leg muscles correlates with kick speed. The results of the 27 Wadokai dojo athletes showed that there was a significant relationship between leg muscle explosive power and kicking speed of the mawashi geri with t count 3.05 and t table 1.708 or t count greater than t table (Purba, 2019). The results of research on junior high school students found there is a correlation between flexibility and leg muscle explosive power with a correlation coefficient of $r = 0.440$ (Novellia, 2017). Research has also been carried out on one thousand people at the age of 23.27 ± 1.41 years. A positive correlation was found between back extensor strength and togok muscle flexibility with a correlation level of $r = -0.720$ and $p < 0.05$ (Arshadi et al, 2009).

Contribution of age, height, weight, and flexibility to the ability of the mae geri Based on the results of the analysis found, the correlation coefficient between age, height, weight, and flexibility of the ability of the mae geri is 0.780 which is positive. This means that the higher the value of the independent variable, the higher the value of the dependent variable. The simultaneous relationship between age, height, weight, and flexibility of the ability of the mae geri was significant ($p < 0.05$). This shows that there is a significant relationship between age, height, weight, and flexibility of the mae geri ability.

The contribution of the determinant coefficient of age, height, weight, and flexibility to the mae geri ability is a product of r^2 to 100% ($r^2 \times 100\%$). Value of r^2 is 0.609, so the contribution of age, height, weight, and flexibility to the mae geri ability is $= 0.609 \times 100\% = 60.9\%$. The remaining 39.1% is influenced by other factors.

CONCLUSION

The results showed that there was a positive and significant relationship between flexibility and mae geri ability with a strong relationship of $r = 0.698$ and $p = 0.000$. ($p < 0.05$). Age,

height, weight, and flexibility contribute as much as 60.9% to the ability of the mae geri kick while the rest is determined by other factors not examined.

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