
Analysis of Grip Strength in Kurash Athletes in Makassar City

M.Imran Hasanudin¹ Muslim Bin Ilyas²

¹Universitas Negeri Makassar, Fakultas Ilmu Keolahragaan dan Kesehatan, Sulawesi Selatan, Indonesia

²Universitas Negeri Makassar, Fakultas Ilmu Keolahragaan dan Kesehatan, Sulawesi Selatan, Indonesia

*corresponding author m.imran@unm.ac.id

ABSTRACT

Grip strength is one of the important components of physical condition in the sport of Kurash because most engineering activities involve the athlete's ability to maintain a grip, control the opponent, and generate pull when performing the slam technique. This study aims to determine the grip strength profile of Kurash athletes in Makassar City. The research uses a quantitative approach with a descriptive method. The research sample consisted of 14 Makassar City Kurash athletes who were selected using the total sampling technique. Grip strength measurement is carried out using a handgrip dynamometer and the measurement results are expressed in kilograms (kg). Data were analyzed using descriptive statistics including mean values, standard deviation, median, minimum, maximum, as well as frequency and percentage distributions. The results of the study showed that the average athlete's grip strength was 36.99 ± 12.94 kg, with a median of 32.80 kg, a minimum value of 22.00 kg and a maximum of 67.90 kg. Based on the grouping based on average scores and sample deviation standards, as many as 1 athlete (7.14%) was in the very good category, 2 athletes (14.29%) were in the good category, 4 athletes (28.57%) were in the medium category, and 7 athletes (50.00%) were in the poor category, while there were no athletes in the very poor category. These results show that there is a considerable variation in grip strength ability between athletes. Therefore, a more structured and individualized strength training program is needed to improve the muscles of the hands, fingers, wrists, forearms, as well as pulling strength that matches the characteristics of the Kurash technique.

Keywords: Grip Strength, Handgrip Strength, Kurash, Athlete.

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Correspondence Address:

M.Imran Hasanudin

Universitas Negeri Makassar

Makassar, South Sulawesi, Indonesia

E-mail: m.imran@unm.ac.id

INTRODUCTION

Kurash is a branch of grappling martial arts that demands a combination of technique, tactical, physical and psychological skills. In a Kurash match, the athlete tries to control the opponent through a grip on the match clothes and further creates an advantageous position to perform the slamming technique. Therefore, the athlete's performance is not only determined by the mastery of the technique, but also by the biomotor abilities that support the implementation of the technique. Recent research on Kurash's performance characteristics shows that biomotor factors play an important role in supporting athletes' success. Irfan et al. (2024) identified a number of physical and psychological factors that contribute to Kurash performance, including strength components as part of the athlete's biomotor abilities. The

findings show the importance of a specific physical condition evaluation as the basis for the preparation of the Kurash training program.

One of the physical components that is relevant to the characteristics of the Kurash is *the grip strength*. Grip strength describes the ability of the muscles of the hands and forearms to generate force when grasping an object. In grappling-based martial arts, this ability is related to the activity of maintaining a grip, pulling, controlling the opponent's body position, and preparing for the execution of attack techniques. Studies of sports that have similar *grappling* characteristics, especially judo, show that grip fights are an important part of performance. Schoof et al. (2024), through a systematic review of the performance characteristics of judoka, showed that characteristics related to *grip fighting* can distinguish athletes based on their performance level and grip strength is one of the relevant indicators in the evaluation of athletes.

In judo, the grip on the opponent's clothing or *kumi-kata* is a technical and tactical element used to control the opponent and create opportunities for slamming techniques. Recent research on judo athletes also places *handgrip strength* measurements as one of the relevant physical condition parameters to describe athlete characteristics, although grip strength alone cannot always predict medal success. This confirms that grip strength needs to be seen as one part of the multidimensional performance profile of athletes. The importance of strength is also supported by a systematic study of strength training in martial arts athletes. Herrera-Valenzuela et al. (2023) report that strength training programs can provide improvements in maximum strength, isometric strength, explosiveness, and some martial sport-specific abilities. In judo athletes, a structured training program can also result in increased *handgrip strength* and specific strength abilities.

In the context of the Makassar City Curriculum, the development of athletes' physical condition is an important part in supporting the achievement of achievements. Research on Makassar City Kurash athletes also shows that strength training interventions can improve arm muscle capabilities, so a more specific evaluation of strength components needs to be carried out as a basis for the preparation of training programs. Nonetheless, research that specifically describes the grip strength profile of Kurash athletes is still relatively limited compared to martial arts such as judo. Though the characteristics of Kurash's technique really require the ability to hold and control the opponent's clothes during the match. By knowing

the grip strength profile of each athlete, the coach can obtain objective information to determine training needs and evaluate the development of physical conditions. Based on this description, this study aims to analyze the level of grip strength of Makassar City Kurash athletes through handgrip strength measurement as well as descriptive analysis, frequency distribution, and percentage. The results of the study are expected to be the initial data in designing a more specific strength training program according to the needs of Kurash athletes.

RESEARCH METHODS

This study uses a descriptive quantitative approach. The research design was used to obtain an objective picture of the level of grip strength of Kurash Makassar City athletes based on the results of measurements using a *handgrip dynamometer*. The research population is Kurash athletes from Makassar City. The research sample consisted of 14 Makassar City Kurash athletes who actively participated in the training process. The sampling technique uses total sampling, i.e. all athletes who meet the research criteria are used as samples.

The instrument used is a handgrip dynamometer. This instrument is used to measure the maximum ability of the muscles of the hand and forearm to produce a grip force. The measurement results are recorded in kilograms (kg). During the test, the athlete holds the *handgrip dynamometer* in a predetermined position, then performs the maximum grip according to the measurement procedure. The value of the measurement results is then recorded and used as research data.

Data Analysis Techniques. Data were analyzed using descriptive statistics in the form of:

1. Mean or average value;
2. Standard deviation;
3. Median;
4. Minimum and maximum values;
5. Frequency distribution; and
6. Percentage.

The percentage is calculated using the formula:

$$P = (f/N) \times 100\%$$

To provide an overview of the internal distribution of the sample, the grip strength categories are arranged based on the mean value (M) and standard deviation (SD). This categorization is a category relative to the study sample, not a clinical norm or population norm based on age and sex.

RESEARCH RESULTS

1. Descriptive Statistical Test Results

The results of the descriptive statistical analysis of the grip strength of Makassar City Kurash athletes are presented in the following table.

Table 1 Descriptive Statistical Test

Statistics	Value
N	14
Red	36.99 kg
Standard Deviation	12.94 kg
Median	32.80 kg
Minimum	22.00 kg
Maximum	67.90 kg
Range	45.90 kg

Based on the results of the analysis, the average grip strength of Kurash athletes in Makassar City is 36.99 kg with a standard deviation of 12.94 kg. The lowest value is 22.00 kg, while the highest value reaches 67.90 kg. The range between the highest and lowest values reaches 45.90 kg. The magnitude of the standard deviation and the range of values indicate that the ability of the grip strength of the athlete varies quite a bit. Some athletes already have relatively high grip strength, while some other athletes are still well below the group's average score.

2. Percentage Analysis Results

Based on the mean and standard deviation of the sample, the relative category intervals can be arranged as follows.

Table 2 Percentage Analysis

Grip Strength Interval	Categories	Frequency	Percentage
> 56.40 kg	Excellent	1	7,14%
43.47–56.40 kg	Good	2	14,29%
30.53–43.46 kg	Medium	4	28,57%
17.59–30.52 kg	Less	7	50,00%
< 17.59 kg	Very Less	0	0,00%
Total		14	100%

The results of percentage analysis showed that the largest category was lacking, which was as many as 7 athletes or 50.00%. A total of 4 athletes or 28.57% were in the medium category, 2 athletes or 14.29% were in the good category, and 1 athlete or 7.14% was in the very good category. There are no athletes who fall into the category of very few. Thus, 50% of athletes were in the poor category based on the internal distribution of the sample, while only 21.43% were in the good and very good category. These findings show that the grip ability between athletes is not evenly distributed.

DISCUSSION

The results of the study showed that the grip strength of the Makassar City Kurash athletes had an average of 36.99 ± 12.94 kg with a minimum value of 22.00 kg and a maximum of 67.90 kg. The considerable difference between the minimum and maximum values indicates the heterogeneity of grip strength abilities among athletes. The findings are important because Kurash is a martial arts sport that relies heavily on the athlete's ability to hold onto the opponent's clothing. Athletes must be able to gain and maintain grip while performing pulls, thrusts, changes of direction, balance, and slamming techniques. Therefore, the strength of the muscles of the hands and forearms is one of the physical abilities that can support the effectiveness of the technique.

According to Irfan et al. (2024), it shows that Kurash's performance is related to various biomotor and psychological factors. Thus, strength development needs to be placed

as part of an integrated physical condition program and not as a stand-alone component. The results of this study can also be explained through the characteristics of *grappling* sports that have similarities between Kurash and judo. Schoof et al. (2024) found evidence that characteristics related to *grip fighting* have relevance in differentiating judoka's performance levels. The ability to acquire a favorable grip position can help athletes in controlling opponents and preparing for the execution of techniques.

Nonetheless, maximum grip strength cannot be used as the sole predictor of performance. A study of 64 cadet-level female judo athletes showed that grip strength did not differ significantly between the medal and non-medal groups. This means that the success of *grappling* is the result of an interaction between anthropometric, physiological, technical, tactical, and psychological factors. This is very relevant in the interpretation of the results of this study. An athlete with the highest score of 67.90 kg, for example, does not necessarily automatically have a better match performance than an athlete with a score of 40 kg. Grip strength needs to be combined with the ability to maintain grip, pulling strength, muscle endurance, leg strength, power, technical speed, coordination, and tactical ability.

The results of the frequency distribution show that 50% of athletes are in the category of less relative to the group. This condition shows the need to pay attention to the hand and forearm strength development program. Strength training in martial arts has been shown to be beneficial to various aspects of physical fitness, including increased maximum strength and isometric. Systematic reviews of strength training in martial arts athletes also showed an increase in *handgrip strength* in several judo training programs. In the context of Makassar City Kurash athletes, these results can be the basis for coaches to include more specific exercises, such as handgrip dynamometer squeeze, farmer's carry, plate pinch, towel pull-up, wrist curl, reverse wrist curl, dead hang, rope pulling, as well as interesting exercises using Kurash jackets or belts. Exercise should be directed not only at maximum strength, but also grip endurance, as athletes must maintain their grip during the fight.

The grip endurance aspect is important because martial arts research shows that repetitive matches can affect the neuromuscular performance of the upper extremities which can be observed through changes in *handgrip strength*. Therefore, the ability to maintain the quality of the grip in a tired condition also needs to be the target of training. The findings of this study ultimately show that the evaluation of grip strength can be used as one of the

instruments for monitoring the physical condition of Kurash athletes. Regular measurements allow the coach to know the progress of each athlete and determine a training program based on individual needs. However, this study has limitations in the form of a relatively small number of samples and no separation based on gender, age, weight class, dominant and non-dominant hands, and training experience. In addition, the categories in this study are categories based on the distribution of sample values, so they cannot be directly considered as the norm of grip strength of Kurash athletes in general. Further research is suggested involving a larger sample and analyzing the relationship between grip strength and weight class, Kurash-specific techniques, competition experience, and competition performance.

CONCLUSION

Based on the results of the study, it can be concluded that the grip strength of 14 Makassar City Kurash athletes has an average value of 36.99 ± 12.94 kg, a median of 32.80 kg, with a minimum value of 22.00 kg and a maximum of 67.90 kg. Based on the category relative to the sample distribution, as many as 7 athletes (50.00%) were in the poor category, 4 athletes (28.57%) in the medium category, 2 athletes (14.29%) in the good category, and 1 athlete (7.14%) in the very good category. These results show that the grip strength of Makassar City Kurash athletes is still quite varied and some athletes need to improve their grip ability. Trainers are advised to provide an exercise program that emphasizes the development of strength and endurance of the hand, fingers, wrist, and forearm muscles combined with Kurash-specific grip exercises. Regular evaluation of grip strength is also necessary to monitor the development of physical condition and be the basis for the individualization of the exercise program.

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