Application of Sprint Exercises to Student Long Jump Performance

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ABSTRACT
This study uses experimental methods with pre-test and post-test designs. The subject of the study is students who are taking athletic courses in the Physical Education, Health, and Recreation Study Program. A total of 30 students were selected by purposive sampling based on certain criteria, such as healthy physical condition, basic ability to jump long jump, and willingness to participate in training programs consistently. Data analysis was carried out using a paired sample t-test statistical test to determine the significant difference between the pre-test and post-test results. The results of the hypothesis test using the Paired Sample T Test are known to have a mean value of 4.3 pre-test data, a mean value of post-test data of 4.9, with a mean difference of 0.6, so it can be said that sprint exercises are able to improve students' long jump skills. Furthermore, based on the results of the study, it is known that the Sig. value is 0.000 or < 0.05, so it can be concluded that there is a difference in the data of pre-test and post-test students' long jump ability. Based on the results of the research and data analysis, it can be concluded that sprint exercises are proven to be effective as a method to improve students' long jump ability.

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INTRODUCTION

Long jump is one of the athletic sports that requires a combination of strength, speed, and good technique (Marta, 2020). In doing the long jump, the initial phase plays a very important role because it determines the success of the subsequent phases, namely repulsion, floating, and landing. An optimal start provides enough speed and momentum to achieve maximum repulsion, thus having a direct impact on the jump distance achieved. Therefore, improving initial performance is one of the main focuses in an effort to improve long jump ability (Makaruk et al., 2020).

One of the training methods that is often used to increase speed and explosiveness in the initial phase is sprint training. Sprints are a form of speed training that involves intensive work of the body's muscles, especially the leg muscles, in a short period of time (Zabaloy

et al., 2023). This exercise not only improves muscle strength, but also trains movement coordination, anaerobic endurance, as well as body reflex responses. Thus, sprint training is considered relevant to improve the quality of the start in the long jump.

A good starting speed depends heavily on correct basic technique, efficient movement patterns, as well as the athlete's ability to control body balance (Jeffreys, 2024). In the context of students who are learning basic long jump techniques, mastering the initial phase is often a challenge in itself. Many students have not been able to reach optimal speed or maintain body stability during the beginning, so the jump results are not optimal. This shows the need for specific and measurable training methods to improve these aspects.

Sprint training provides a variety of benefits that support initial performance in the long jump. Through this exercise, students can improve acceleration, which is the ability to reach maximum speed in a short time. In addition, sprint training also helps improve running techniques, such as ideal body position, effective footwork, and synchronized hand and foot movements. All of these aspects are essential to achieve an optimal start in the long jump.

In practice, the effectiveness of sprint training on the performance of the long jump can be affected by various factors. One of them is the intensity and duration of training. Exercises that are too strenuous or not in accordance with the student's physical abilities can lead to excessive fatigue and increase the risk of injury. Therefore, a sprint training program should be designed with the individual's fitness level and ability in mind. The use of the periodization method, which is the division of training into several stages with a gradually increasing intensity, can be a solution to optimize training results.

In addition, the influence of sprint training on initial performance is also influenced by the level of motivation and commitment of students in undergoing training. Students who have high motivation tend to be more consistent in participating in training programs, so that the results achieved are more optimal (Sutriawan & Syafruddin, 2023). Conversely, lack of motivation can hinder the process of improving performance. Therefore, the role of the coach or instructor is very important in providing encouragement and direction to students during training.

Measurement of the effectiveness of sprint training can be done through various indicators, such as increased running speed, improvement of starting technique, and increase in jump distance. In this study, an analysis of these indicators can provide a clear picture of the extent to which sprint training contributes to initial performance in the long jump. The data obtained from these measurements can also be used to evaluate the exercise program that has been implemented, so that adjustments can be made if necessary.

Research on the effectiveness of sprint training in the initial phase of the long jump has high relevance, especially in the context of sports coaching in college. The results of this study can make a significant contribution to the development of more effective and efficient exercise methods. In addition, this research can also be a reference for students who want to improve their long jump skills through a science-based exercise approach.

In a broader perspective, improving long jump performance through sprint training not only has an impact on sports achievement, but also on the development of students' character. Through this exercise, students are taught the importance of discipline, hard work, and commitment in achieving goals. These values are in line with the goals of physical education which are not only oriented towards physical achievement, but also the formation of positive character.

In addition, this study also has practical implications for sports coaches or instructors. By understanding the effectiveness of sprint exercises, they can design exercise programs that are more specific and tailored to the needs of students. This is expected to improve the

quality of sports learning in higher education, so that more students are able to achieve optimal achievements in the field of sports, especially the long jump.

Previous studies have shown that sprint training has a positive influence on athletic ability, including in the long jump sport (Ramirez-Campillo et al., 2021). However, most of the research was conducted on professional athletes or high school students. Research on the application of sprint exercises to students is still relatively limited, so this research can fill this gap and provide new insights in the context of physical education in higher education.

Thus, this study not only aims to test the effectiveness of sprint training on the initial performance of the long jump, but also to contribute to the development of exercise science in general. The findings of this study are expected to be the basis for the development of more innovative and effective exercise methods, so that they can be applied in various contexts, both at the university level and beyond.

Overall, this study aims to provide a deeper understanding of the relationship between sprint training and initial performance in the long jump. Through a comprehensive analysis, this research is expected to provide practical solutions for students and coaches in improving their long jump skills. In addition, this research is also expected to be an inspiration for future research in the field of sports and physical education.

MATERIALS AND METHODS

This study uses experimental methods with pre-test and post-test designs. The subject of the study is students who are taking athletic courses in the Physical Education, Health, and Recreation Study Program. A total of 30 students were selected by purposive sampling based on certain criteria, such as healthy physical condition, basic ability to jump long jump, and willingness to participate in training programs consistently.

The sprint training program is designed for 8 weeks with a frequency of training three times a week. Each training session consists of a warm-up, core exercise, and cool-down. Core exercises include various forms of sprints, such as short-distance sprints (20-40 meters), sprints with varying intensity, and acceleration exercises. The program also uses a periodization method, with a gradual increase in exercise intensity every two weeks.

Data analysis was carried out using a paired sample t-test statistical test to determine the significant difference between the pre-test and post-test results. In addition, descriptive analysis is also used to provide an overview of changes in student performance after participating in the sprint training program. All analyses are carried out with the help of relevant statistical software.

During the conduct of the study, ethical aspects were also considered, including written consent from participants, confidentiality of data, and fair treatment of all participants. With this research method, it is hoped that valid and reliable findings can be obtained regarding the effectiveness of sprint training on the initial performance of students' long jump.

RESULTS

To answer the questions in this study, data analysis was carried out using the paired sample t test which was first carried out as a normality test as a prerequisite test. The results of the data analysis in this study are as follows.

Table 1. Descriptive Test

Data	N	Range	Min.	Max.	Mean	Std. Deviation
Long Jump Pre-Test	30	.40	4.10	4.50	4.3	.13
Post-Test Long Jump	30	.55	4.65	5.20	4.9	.15

The results of the descriptive test of the pre-test and post-test data of the long jump are as follows:

a. The results of the descriptive test of the students' long jump pre-test data were known to have a range value of 0.40, the lowest score of 4.10, the highest score of 4.50, the average score of 4.3, and the standard deviation value of 0.13.

b. The results of the descriptive test of the student long jump post-test data were known to have a range value of 0.55, the lowest score of 4.65, the highest score of 5.20, the average score of 4.9, and the standard deviation value of 0.15.If the authors want to display a figure, use the following format:

Table 2. Normality Test

Data	N	Sig.	α	Result
Long Jump Pre-Test	30	0.200	> 0.05	Normal
Post-Test Long Jump	30	0.154	> 0.05	Normal

The results of the normality test of the pre-test and post-test data of students' long jump ability were known to have Sig. values of 0.200 and 0.154, respectively. Because the value of Sig. is 0.05 for each > data, it can be concluded that the pre-test and post-test data of students' long jump ability are normally distributed.

Table 3. Hypothesis Test

Data	N	Mean	Mean Difference	Sig.
Pre-Test Long Jump	30	4.3	0.6	0.000
Post-Test Long Jump	30	4.9		

The results of the hypothesis test using the Paired Sample T Test are known to have a mean value of 4.3 pre-test data, a mean value of post-test data of 4.9, with a mean difference of 0.6, so it can be said that sprint exercises are able to improve students' long jump skills. Furthermore, based on the results of the study, it is known that the Sig. value is 0.000 or < 0.05, so it can be concluded that there is a difference in the data of pre-test and post-test students' long jump ability.

DISCUSSION

The results of the study showed that sprint training had a significant impact on improving initial performance in the long jump of students. From the data obtained, the average post-test results showed an increase in jump distance compared to the pre-test results. This indicates that the sprint training program designed for eight weeks has succeeded in improving students' abilities, especially in the initial phase of the long jump.

This increase in jump distance can be attributed to the improvement in running speed achieved during the initial phase (Keller et al., 2020). Sprint exercises that are carried out consistently help students improve their acceleration (Pareja-Blanco et al., 2021). Optimal acceleration allows students to reach maximum speed in a short time, thus providing greater momentum when repelling. This momentum is the key to success in producing longer jump distances.

In addition to the increase in speed, sprint practice also contributes to the improvement of students' starting techniques. More efficient running techniques, such as optimal body position, regular footsteps, and good coordination of movements, also play a role in improving the quality of the start. Observations during the study showed that

students who participated in the exercise program were able to improve their body position when running, thereby reducing air resistance and increasing stability.

Sprint exercises also help students improve the explosiveness of their leg muscles. Through acceleration exercises and short-distance sprints, students are trained to produce maximum power in a short time. This explosive power is essential for generating a strong repulsion, which ultimately contributes to the increase in jump distance. From the available data, students who showed a significant increase in the rejection phase tended to have better post-test results.

Student motivation during the training program is also an important factor that supports the success of this research. Students who committed to practice consistently showed better performance improvement compared to those who were less disciplined (Golann & Torres, 2020). The role of the instructor in providing motivation and direction during the exercise has proven to be effective in maintaining student consistency.

In terms of exercise program design, the periodization method used for eight weeks had a positive impact on the results of the study. The gradual increase in exercise intensity helps students adjust to the weight of the exercise without experiencing excessive fatigue. Additionally, variations of sprint training, such as short-distance sprints and acceleration exercises, provide different stimuli to the muscles, helping to improve overall performance.

The use of an experimental approach with a pre-test and post-test design provides high validity for the results of this study. Statistical analysis showed that the difference between the pre-test and post-test results was significant, so it can be concluded that sprint training has a real influence on the students' long jump initial performance. These findings support the hypothesis that sprint training is an effective method to improve long jump ability.

The results of this study also make an important contribution to the development of sports learning methods in universities. By using sprint exercises, students can learn the basic techniques of the long jump more effectively. In addition, the results of this study can be a reference for coaches in designing specific training programs to improve students' athletic performance.

From the point of view of physical education, this study shows that sports not only function to improve physical ability, but also shape the character of students (Syafruddin et al., 2022). The discipline, hard work, and commitment instilled during the training program are values that are in line with the goals of physical education. Therefore, sprint training not only improves sports performance, but also has a positive impact on students' personal development.

The practical implications of this study are very wide. In addition to providing practical solutions for students and coaches, the results of this research can also be used to develop athletic training programs at the university level. By understanding the effectiveness of sprint training, educational institutions can improve the quality of sports coaching, so that more students are able to achieve optimal achievements.

The results of this study also provide new insights in the context of sports research. Most previous studies have focused on professional athletes or high school students, while this study has successfully filled the gap with a focus on college students. This finding makes a significant contribution to the development of sports science, especially in the field of physical education.

In conclusion, this study proves that sprint training is an effective method to improve initial performance in the long jump. Increased running speed, improvement of starting technique, and increased explosiveness are the main factors that contribute to the success of the training program. With a robust research design and comprehensive data analysis,

the results of this study provide a solid scientific basis for the development of more innovative training methods in the future.

CONCLUSION

Based on the results of research and data analysis, it can be concluded that sprint training has proven to be effective as a method to improve the ability to long jump of students of the Physical Education, Health, and Recreation Study Program to Elementary School, Faculty of Sports Sciences, State University of Makassar.

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