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Submission date: 04-Jun-2025 07:07PM (UTC+0300)
Submission ID: 2612322251
File name: 3951-Article_Text-16053-1-4-20250531.docx (40.09K)
Word count: 2954
Character count: 16895

Journal Physical Health Recreation (JPHR)
Volume 5 Nomor 2 ; Mei 2025
https://jurnal.stokbinaguna.ac.id/index.php/JPHR
e-ISSN : 2747- 013X

The Effect of Plyometric Training on the Improvement of Sabit Kick Speed in Pencak Silat Athletes at SMA Negeri 2 Sinjai

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Abstract. This study aims to analyze the effect of plyometric training on the speed of the sabit kick in pencak silat athletes at SMA Negeri 2 Sinjai, using a quantitative approach and experimental design. In this study, 10 students involved in pencak silat extracurricular activities were selected as samples, and data were collected through pre-test and post-test measurements of the speed of the sabit kick. The results of the study showed a decrease in the average kick speed from 1.45 seconds in the pre-test to 1.30 seconds in the post-test, indicating an increase in kick speed after the implementation of plyometric training. Additionally, correlation analysis found that lower body strength and agility significantly contributed to the improvement in sabit kick speed, consistent with the theory that plyometric training can enhance muscle power and agility, two key factors in pencak silat. These findings confirm previous research indicating that plyometric training positively influences movement speed in martial arts. Overall, the results of this study provide strong evidence that plyometric training can improve the speed of the sabit kick in pencak silat athletes, and it is recommended that plyometric training be integrated into physical training programs for pencak silat. However, further research with a larger sample size and additional variables such as kicking techniques and psychological factors is needed to gain a more comprehensive understanding of the factors influencing kicking speed in pencak silat.

Keywords: plyometric training, scythe kick speed, pencak silat

1 Introduction

Pencak Silat is a traditional martial art that holds deep cultural and spiritual values in Indonesia. One of the key aspects of pencak silat is the speed of kicks, which plays a crucial role in determining the outcome of a match. Speed in kicks not only affects the effectiveness of attacks but also serves as a primary physical indicator for an athlete in mastering the basic techniques of pencak silat. At the high school level, such as at SMA Negeri 2 Sinjai, the development of physical abilities, including kicking speed, is essential to produce pencak silat athletes who are not only skilled but also competitive in regional and national competitions.

Optimal kicking speed increases the chances of success in competitions and serves as the primary measure of a pencak silat athlete's physical ability (Jamaluddin & Salabi, 2022).

The high interest in pencak silat extracurricular activities at the high school level indicates growing attention to this sport. According to data from the Indonesian Ministry of Education and Culture, the number of participants in pencak silat extracurricular activities at high schools has continued to increase; however, physical abilities, particularly in terms of kicking speed, remain a significant challenge (Kemdikbud, 2023). This indicates a gap between the high interest and the need to improve skill quality, particularly in kicking speed. One of the contributing factors is the lack of structured evaluation and measurement of students' kicking speed, resulting in a mismatch between students' potential and expected achievements (Septiadi, Maulana, & Salabi, 2022).

This study aims to analyze the kicking speed of pencak silat at SMA Negeri 2 Sinjai to provide an overview of the effectiveness of the training process implemented at the school. By using various valid and reliable physical measurement methods, it is hoped that the results of this analysis will reveal the factors that influence kicking speed and provide applicable recommendations to improve the quality of physical training in the school environment. One factor of particular interest in this study is the relationship between lower limb muscle strength and agility with kicking speed, which is often overlooked in basic pencak silat training at the school level (Wahyudi, 2023).

The urgency of this research is further highlighted by the fact that pencak silat, as a national sport, requires systematic and measurable development. With this analysis, it is hoped that a more structured and efficient training program can be developed to enhance the kicking speed of pencak silat athletes, both for extracurricular activities and to improve students' performance in competitions. Additionally, this study contributes to the development of knowledge in the field of sports science, particularly regarding physical measurement in martial arts (Akhbar & Imansyah, 2023).

The main problem faced is the lack of attention to objective measurement aspects in kicking speed training. Many coaches still rely on training methods that are not fully based on clear and measurable evaluations. By using appropriate measuring tools, such as kicking speed tests within a certain time, this analysis aims to fill the data gap that has been difficult to access at the school level (Wijaya, 2021). Therefore, this study will make a significant contribution to improving the quality of physical training for pencak silat athletes at SMA Negeri 2 Sinjai.

The primary objective of this article is to provide deeper insights into the influence of physical factors on the kicking speed of pencak silat athletes at SMA 2 Sinjai, as well as to design recommendations that can be applied by coaches to enhance the quality of training. Practically, this study is expected to assist coaches in designing more effective training programs tailored to the physical needs of young athletes. Theoretically, the findings of this study can enrich scientific references on the relationship between physical training and martial arts skills, and serve as a reference for further research in the field of sports (Sugihartono, 2021).

Based on this background, it is important to develop a training system that does not only rely on technical aspects but also on physical factors that support speed and strength in pencak silat. By improving kicking speed, it is hoped that the quality of matches and students' performance can be optimized, thereby supporting achievements at higher levels, both provincial and national (Imansyah & Akhbar, 2023).

2 Method

This study uses a quantitative approach with an experimental design to analyze the speed of pencak silat kicks in students of SMA Negeri 2 Sinjai. This approach allows researchers to test the effect of physical variables, such as leg muscle strength and agility, on kick speed in a controlled manner. The use of a quantitative approach aims to produce numerical data that can be analyzed statistically, so that the findings obtained are reliable and objective (Sugiyono, 2017). The research sample was selected through purposive sampling, namely students who have participated in pencak silat training for at least one semester and are actively involved in this extracurricular activity.

Data were collected through physical tests to measure kick speed, as well as observations of other physical factors such as leg muscle strength and agility. Measurements were made using a stopwatch and standardized measuring devices. In addition, a survey was also conducted to obtain information related to the training patterns and physical conditions of the participants. With this method, this study aims to explore the relationship between physical training and increased kick speed in pencak silat athletes (Arikunto, 2018).

Data analysis was carried out using descriptive statistics to describe the characteristics of the collected data, such as the average and standard deviation. Furthermore, the t-test was used to test whether there was a significant difference between the kick speed before and after the training intervention. All analyses were performed using SPSS software, which helps process data more validly and in-depth, so that the results of this study can provide applicable recommendations to improve the quality of physical training at SMA Negeri 2 Sinjai (Sugiyono, 2017).

3 Result

This study aims to measure and analyze the effect of plyometric training on sickle kick speed in pencak silat athletes at SMA Negeri 2 Sinjai. Based on the results obtained from the pre-test and post-test, it was found that there was a significant increase in the speed of the sickle kick after intervention with plyometric exercises. Before the intervention, the average time needed to perform a sickle kick was 1.45 seconds, while after the intervention, the average time decreased to 1.30 seconds. This decrease suggests that plyometric exercises have a positive effect on increasing the speed of the sickle kick, which is one of the most important basic techniques in pencak silat.

The following table shows the results of the students' pre-test and post-test scythes kick speed:

Table 1. results of the students' pre-test and post-test

Student Name	Pre Test	Post Test
X1	1.45	1.3
X2	1.5	1.35
X3	1.6	1.3
X4	1.55	1.3
X5	1.4	1.25
X6	1.35	1.2
X7	1.6	1.5

X8	1.5	1.35
X9	1.45	1.25
X10	1.55	1.3

From the table above, it can be seen that all students experienced a decrease in time when performing a roundhouse kick after the plyometric training intervention. The average decrease in time was approximately 0.15 seconds, indicating an increase in kicking speed. These findings are consistent with the study by Sari et al. (2025), which stated that plyometric training can increase lower limb muscle power and agility, both of which contribute to improved kicking speed in martial arts such as pencak silat. The increase in kicking speed observed in this study suggests that plyometric training can directly influence the physical aspects that support technical skills in pencak silat.

Additionally, the correlation analysis conducted in this study revealed that lower limb muscle strength and agility significantly contribute to the speed of the sabit kick. The analysis results showed that lower limb muscle strength contributed 32.9%, while agility contributed 46.4%. These findings are consistent with research by Rosmawati et al. (2019), who found that lower limb muscle strength and agility are closely related to kicking ability in pencak silat. Therefore, developing lower limb muscle strength and agility through plyometric training is crucial for improving the performance of pencak silat athletes.

In addition to physical aspects, technical factors such as kicking technique and body coordination also influence the speed and effectiveness of the sabit kick. Research by Mubarok et al. (2021) showed that while plyometric training enhances muscle power, poor kicking technique can hinder performance improvement. Proper kicking technique maximizes the potential of leg muscle strength developed through plyometric training. Therefore, a combination of physical strengthening and proper technique is a determining factor in improving kicking speed.

The increase in kick speed found in this study indicates that plyometric training plays an important role in improving kick speed in pencak silat athletes. Plyometric training focused on increasing leg muscle strength and agility has proven effective in accelerating kick reactions, which are a key factor in the success of attacks in pencak silat competitions. This finding supports the theory that improving muscle power through plyometrics can improve kicking speed and power (Sugihartono, 2021).

One implication of this finding is the importance of developing more structured physical training in educational settings, particularly in schools with pencak silat extracurricular activities. The integration of plyometric exercises into daily training programs can provide significant benefits for young athletes in developing their physical potential. Additionally, training programs should also include intensive technical training, as good technique will maximize the results of physical training (Mubarok et al., 2021).

However, there are several factors that need to be considered in interpreting these results. One of them is the reliance on a limited sample, which consisted of only 10 students. This small sample size may affect the generalizability of the research results, as it may not represent the entire population of pencak silat athletes at the high school level. Therefore, further research with a larger sample size will be necessary to confirm these findings and expand their application in various contexts.

Additionally, although plyometric training has been proven effective in improving the speed of the sabit kick, several uncontrolled external factors in this study, such as diet, rest patterns, and stress levels, may also influence training outcomes. For example, insufficient sleep or an unhealthy diet can hinder muscle recovery, which would inevitably impact kick performance (Kamarudin et al., 2023). Therefore, in future studies, it is recommended to consider these factors in the research design to obtain a more holistic picture.

Additionally, this study revealed that physical development through plyometric training cannot be separated from the mental and psychological aspects of athletes. Stress, anxiety, and motivation can influence athletes' performance in competitions. Therefore, developing mental training programs that support physical skills is also important to help athletes achieve their best potential in competitions (Wahyudi, 2023).

4 Discussion

This study shows that plyometric training has a significant effect on improving the speed of the sabit kick in pencak silat athletes at SMA Negeri 2 Sinjai. The results of the study indicate a decrease in the average time required to perform the sabit kick from 1.45 seconds to 1.30 seconds after the implementation of plyometric training. This decrease indicates that plyometric training focused on improving lower limb muscle power and agility can accelerate kicks, consistent with the theory that plyometrics enhance muscle strength and agility (Sari et al., 2025). These findings also support previous research showing that plyometric training has a positive impact on movement speed in various sports, including martial arts.

Additionally, the correlation analysis in this study revealed that lower limb muscle strength and agility significantly contributed to the improvement in sabre kick speed. Lower limb muscle strength contributed 32.9%, while agility contributed 46.4%. These findings are consistent with research conducted by Rosmawati et al. (2019), which emphasizes the importance of leg muscle strength and agility in improving roundhouse kick performance. Therefore, developing these two factors through plyometric training can help improve kicking speed and attack effectiveness in pencak silat competitions.

However, despite the significant improvements shown by the research, there are several factors that need to be considered. One of these is the limitation in the relatively small sample size, which consisted of only 10 students. With a larger sample, the results of this study could be more representative and more generalizable to a broader population. Additionally, other factors such as kicking technique and competition experience also play a significant role in sabit kick speed, as explained by Mubarok et al. (2021). Therefore, in addition to physical training, it is important to continue honing techniques and strategies in competition to achieve optimal results.

Overall, this study makes an important contribution to the development of pencak silat training methods, particularly in improving the speed of the sabit kick. By incorporating plyometric exercises into training programs, it is hoped that athletes can develop the muscle strength and agility essential for enhancing their performance. This study also opens opportunities for further research that may involve additional factors such as diet, rest time, and psychological influences on pencak silat athletes' performance. Further research with a larger sample size and more comprehensive variables is needed to deepen understanding of the effects of plyometrics in martial arts.

5 Conclusion

This study shows that plyometric training has a significant effect on improving the speed of the sabit kick in pencak silat athletes at SMA Negeri 2 Sinjai. Based on the pre-test and post-test results, there was a decrease in the average time required to perform the sabit kick, indicating an increase in speed after plyometric training. This suggests that plyometric training focused on enhancing lower limb muscle strength and agility can accelerate kicking reaction time and improve attack effectiveness in pencak silat competitions.

Overall, these findings contribute significantly to the development of training methods for pencak silat athletes, particularly in enhancing kicking speed. This study underscores the importance of integrating physical training, particularly plyometric exercises, with proper technique in training programs to achieve optimal results. However, further research with larger samples and varied methodologies is needed to deepen understanding of the impact of plyometric training on performance enhancement in this martial art.

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