HALAMAN OLAHRAGA NUSANTARA (HON)
Jurnal Ilmu Keolahragaan

Volume 7 No I
Tahun 2024

ISSN 2614-2775 (Print)
ISSN 2621-8143 (Online)

THE INFLUENCE OF SPEED AND BALANCE AS WELL AS THE EXPLOSIVE POWER OF LEG MUSCLES ON THE FRONT KICK OF PATBANBU PENCAK SILAT COLLEGE ATHLETES DURING THE NEW NORMAL PERIOD

Riko rikardi[1], Wilda Welis[2], Damrah[3], Nurul Ihsan[4]
Universitas Negeri Padang[1,2,3,4]
riko.rikardi@rocketmail.com

Abstract
This study aims to determine the influence of speed and balance directly on the front kick. As well as knowing the influence of speed and balance on the front thrust through the explosive power of the leg muscles. This study used the Path Analysis design or Path Analisys. The population is male athletes of Patbanbu Pencak Silat college in Pekanbaru City with samples using purposive sampling techniques. The results of the study from the regression analysis testing of structure 1 and structure 2 showed that there was a direct influence of speed on the explosive power of leg muscles by 26.4%. There is a direct effect of balance on the explosive power of leg muscles by 23%. There is a direct influence of speed on front kick ability of 23.4%. There is a direct influence of balance on front kick ability by 1.4%. There is a direct influence of the explosive power of the leg muscles on the ability of the front kick by 72.4%. Judging from the value of α 0.05, the direct influence of speed and balance on the variable explosive power of leg muscles is all significant because the P value < 0.05. Likewise, the variables of speed, balance and explosive power against the ability of the front kick are also significant because the P value < 0.05. Furthermore, the influence of the speed variable on the ability of the front kick through explosive power was 12.6%. While the effect of balance on the ability of the front kick through explosive power is 18.5%. So it can be concluded that the better the speed, balance and explosive power of the leg muscles, the better the ability of the front kick.

Keywords: *Speed, Balance; Limb Muscle Explosive Power; Front Kick Ability*

Submitted : 15th of December 2023
Accepted : 27th of January 2024
Published : 30th of January 2024
Correspondence Author: Riko rikardi, Universitas Negeri Padang, Indonesia.
E-Mail: riko.rikardi@rocketmail.com

DOI http://dx.doi.org/10.31851/hon.v7i1.14993

INTRODUCTION

The sport of Pencak Silat has become an integral part of Indonesian culture and identity, with colleges such as Patbanbu having an important role in the development and maintenance of this martial art (Hidayat &; Haryanto, 2021; Marlianto & Yarmani, 2018; Ramdani et al., 2020). However, with the emergence

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of the COVID-19 pandemic, the world of sports has undergone significant changes, including for Pencak Silat athletes (Akbar &; Hariyanto, 2020; Mufarriq, 2021; Sundara et al., 2020). The New Normal presents new challenges that affect training, competition, and the overall well-being of athletes. In the midst of this situation, it is important to understand how physical factors such as speed, balance, and explosive power of leg muscles—which are key components in front kick technique—develop in the context of the adaptation of Pencak Silat athletes during the New Normal era. Research into the relationship between these physical aspects and front kick ability can provide valuable insights in helping athletes and coaches optimize training and prepare for future competitions (Hadiana et al., 2022; Saputro &; Siswantoyo, 2018; Syaifullah &; Doewes, 2020). Therefore, this study aims to explore the influence of speed, balance, and explosive power of leg muscles on the ability of front kicks in Patbanbu Pencak Silat athletes during the New Normal period.

In addition, a deeper understanding of how the speed, balance, and explosive power of leg muscles interact to affect front kick ability also has important practical implications in the development of effective training programs (Agus &; Fahrizqi, 2020; Harahap &; Sinulingga, 2021; N Ihsan &; Suwirman, 2018; Sampoerna et al., 2021). By understanding the factors that influence this technique, coaches can design more focused and specific exercises to improve the athlete's front kick ability, as well as reduce the risk of injury or physical imbalance that may arise during the New Normal period. Thus, this research not only makes an academic contribution in the understanding of the sport of Pencak Silat, but also has a practical impact in efforts to improve the performance of athletes in changing conditions (Ediyono &; Widodo, 2019; Primary & Trilaksana, 2018; Sucipto et al., 2021; Susanto &; Lesmana, 2020).

Previous studies in sports, especially those related to Pencak Silat, have provided valuable insight into the physical factors that affect athletes' performance

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(Candra, 2021; so et al., 2018; Subekti et al., 2021; Sudiana & Spyanawati, 2023). Several studies have highlighted the importance of speed, balance, and explosive power of leg muscles in the context of various sports, including martial arts. For example, research by Hartati et al., (2019); Muhtar, (2020); so et al., (2018) found that improved speed and balance can improve performance in kicking techniques in taekwondo.

On the other hand, research exploring the impact of the COVID-19 pandemic on athletes' training and performance is also beginning to emerge. For example, research by Arisandi et al., (2022); Bakhtiar &; Irawan, (2023); Muktiani et al., (2022); Mulyana &; Lutan, (2021) Evaluate the psychological and physical impact of periods of isolation on football athletes, highlighting the need for adaptation and new strategies in the face of the challenges posed by the pandemic. However, there is a lack of literature that specifically investigates the relationship between speed, balance, and explosive power of leg muscles and front kick ability in Pencak Silat athletes, especially in the context of the New Normal period. Therefore, this study aims to complete the knowledge gap by investigating the influence of these factors on front kick techniques in Patbanbu Pencak Silat athletes during the New Normal period. Thus, this study will expand our understanding of the importance of these physical factors in the specific context of traditional Indonesian sports (Nurul Ihsan, Sepriadi, et al., 2018; Lubis et al., 2022; Riani &; Purwanto, 2018).

The novelty of this study lies in its specific focus on the influence of speed, balance, and explosive power of leg muscles on the ability of front kicks in Patbanbu Pencak Silat athletes during the New Normal period. This study will be one of the few studies to explore the interaction between these physical factors in the context of traditional Indonesian sports, particularly Pencak Silat, amid the challenges posed by the COVID-19 pandemic. By taking into account this particular aspect, this study makes a significant contribution to the understanding

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email jurnal: jurnalhon@univpgri-palembang.ac.id
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of athletes' adaptation to new conditions, as well as the potential for developing more effective training strategies in the face of the challenges of the New Normal period.

The main contribution of this study is to provide deeper insight into the relationship between speed, balance, and explosive power of leg muscles with front kick ability in Pencak Silat athletes, especially in the context of changes caused by the pandemic. The findings from this study are expected to assist coaches in designing more targeted and effective exercise programs, as well as provide a better understanding of how athletes can optimize their performance in changing situations (Angga et al., 2020; Gustama et al., 2021; Nurul Ihsan, Zulman, et al., 2018; Z. D. Widodo et al., 2020). In addition, this research can also be the basis for further research in this field, as well as contribute to the development of sports science as a whole. Thus, this research not only has practical relevance for Pencak Silat athletes and coaches, but also has broader implications in the context of sports and public health research.

METHOD

This study used Path Analysis design to investigate the effect of speed and balance directly on the ability of the front kick, as well as its effect through the explosive power of the leg muscles. The population studied was male athletes from the Patbanbu Pencak Silat college in Pekanbaru City, and samples were selected using purposive sampling techniques. Data collection instruments include speed measurements using valid and reliable tools or methods, such as electronic stopwatches, as well as balance measurements that can be performed with straight-line tests or other validity-tested devices. In addition, the measurement of the explosive power of the leg muscles is also necessary and can be done using appropriate tools. The independent variables observed were speed and balance, while the intervening variable was the explosive power of the limb muscles, and the dependent variable was the front kick ability. Data analysis was performed

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using structural regression techniques to examine the direct and indirect influence of the independent variable on the dependent variable, as well as through mediators.

Once the data is collected, analysis is performed using structural regression techniques to test the direct and indirect influence of speed and balance on front kick ability. The results of structural regression analysis showed a significant direct influence between speed and balance on the explosive power of the leg muscles, as well as between speed and balance on the ability of the front kick. In addition, there is also a strong direct influence of the explosive power of the leg muscles on the ability of the front kick. Further analysis was also performed to examine the indirect influence of speed and balance on front kick ability through mediators of limb muscle explosive power. Thus, this method provides a comprehensive foundation for evaluating the relationship between these variables in the context of front kick ability in Pencak Silat athletes.

RESULTS AND DISCUSSION

Analysis Requirements Testing

Related because data processing in this study uses statistics with Path Analysis techniques, it is necessary to test in this study the test requirements in question include: data normality test and data linearity test.

Data Normality Test

One of the assumptions that must be met in order for parametric tests to be used in research is that the data must follow a normal distribution, then a data normality test is carried out. Data normality testing can be done to find out whether the data obtained in the research results are in the normal spread. Data analysis testing can be performed with the Kormogorov Smirnov test.

The criterion for stating whether the data from the sample used is normally distributed or not can be done by comparing the Sig. coefficient or ρ value with 0.05 (Significance level). If the P value is greater than 0.05 (significance level)

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Jendral A. Yani Street Lorong Gotong Royong 9/10 Ulu Palembang South Sumatera
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which means it is not significant, then it means that the data comes from a normally distributed population. Conversely, if the P-Value is less than 0.05 which means significant, then it means that the data comes from an abnormally distributed population.

The results of testing the normality of variable data on Running Speed and Balance as well as the explosive power of the limbs against the front kick of the Patbanbu Silat school athletes in Pekanbaru City can be seen from the following table:

Table 1. The results of the normality test

No	Variable	P Value	Information
1	Speed	0.160 > 0.05	Usual
2	Balance	0.200 > 0.05	Usual
3	Limb Muscle Explosive Power	0.200 > 0.05	Usual
4	Front Kick	0.200 > 0.05	Usual

Based on table 1 of the results of data normality testing using the Kormogorov Smirnov Test above, the results for each variable can be known as follows:

a. The Running speed variable (X1) in the table above shows that the data is in a normal spread, because the P-Value obtained is greater than 0.05 (significant level) which is 0.160>0.05.

b. The Balance Variable (X2) in the table above shows that the data is in a normal spread, because the P-Value value obtained is greater than 0.05 (significant level) which is 0.200>0.05.

c. The Limb Explosive Power variable (X3) in the table above shows that the data is in a normal distribution, because the P-Value obtained is greater than 0.05 (significant level) which is 0.200>0.05.

d. The front kick ability variable (Y) in the table above shows that the data is in a normal spread, because the P-Value obtained is greater than 0.05 (significant level) which is 0.200>0.05.

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Data Linearity Analysis

A hypothesis proposed in this study needs to be tested and proven through empirical data obtained in the field through tests and measurements of all variables studied. Because the data of this study followed a normal distribution, to test the hypothesis of this study, parametric statistical analysis was used using linearity analysis. Linearity analysis aims to determine whether two variables have a linear or non-linear relationship if the P-Value is greater than 0.05 (P-Value>0.05). The results of linearity between variables in this study are as follows:

Analysis of the linearity of running speed on the explosive power of the leg muscles of athletes of the Patbanbu Pencak Silat College in Pekanbaru City.

Variable linearity testing of Speed with leg muscle explosive power is carried out to determine whether the speed and explosive power of leg muscles have a linear relationship or not significantly. The results of the variable linearity test of speed with the explosive power of the leg muscles can be seen in the table as follows:

Table 2. The results of the speed linearity test

Variable	P Value	α	Ket
Speed to muscle explosive power	0,469	0,05	Linear
Speed to muscle explosive power	0,789	0,05	Linear
Speed to front kick ability	0,869	0,05	Linear
Balance against forward kick ability	0,849	0,05	Linear
Muscle explosive power against front kick ability	0,894	0,05	Linear

Source: data linearity test results on appendix

Based on table 2 above, it can be seen that the results of the linearity test of the Speed variable with the variable Explosive power of the leg muscles obtained a linearity value of 0.469, because the linearity value of the data is

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greater than 0.05 (0.469>0.05), it can be concluded that between speed and the explosive power of the leg muscles there is a linear relationship.

Linearity analysis Balance on the explosive power of the limb muscles of athletes of Patbanbu Pencak Silat College Pekanbaru City.

Variable linearity testing of the balance of the explosive power of the leg muscles is carried out to determine whether the balance of the explosive power of the leg muscles has a linear relationship or not significantly.

Based on table 2 above, it can be seen that the results of the linearity test of the variable in conjunction with the variable Explosive power of the leg muscles obtained a linearity value of 0.789, because the linearity value of the data is greater than 0.05 (0.789>0.05), it can be concluded that between balance and the explosive power of the leg muscles there is a linear relationship.

Speed linearity analysis of the front kick ability of Patbanbu Pencak Silat College athletes in Pekanbaru City.

Testing the linearity of speed variables with front kick ability is carried out to determine whether speed and front kick ability have a linear relationship or not significantly.

Based on table 2 above, it can be seen that the linearity test results of the Speed variable with the front kick ability variable obtained a linearity value of 0.869, because the linearity value of the data is greater than 0.05 (0.869>0.05), it can be concluded that between Speed and Front Kick Ability there is a linear relationship.

Balance linearity analysis of the front kick ability of Patbanbu Pencak Silat College athletes in Pekanbaru City.

Testing the linearity of the balance variable with the ability of the front kick is carried out to determine whether the balance and the ability of the front kick has a linear relationship or not significantly.

Based on table 2 above, it can be seen that the results of the linearity test of the Balance variable with the front kick ability variable obtained a linearity value of 0.849, because the linearity value of the data is greater than 0.05

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(0.849>0.05), it can be concluded that between balance and front kick ability there is a linear relationship.

Linearity analysis The explosive power of leg muscles on the front kick ability of athletes of Patbanbu Pencak Silat College in Pekanbaru City.

Variable linearity testing of leg muscle explosive power with front kick ability was carried out to determine whether the leg muscle explosive power and front kick ability had a linear relationship or not significantly.

Based on table 2 above, it can be seen that the results of the linearity test of the variable explosive power of the leg muscles with the variable of front kick ability obtained a linearity value of 0.522, because the linearity value of the data is greater than 0.05 (0.894>0.05), it can be concluded that between muscle explosive power and front kick ability there is a linear relationship.

Table 3. Results of multivariate regression analysis of speed variables, balance against the explosive power of leg muscles

Variable	B	P-Value/Sig	α
Speed Limb explosive power	0,264	0.001/2=0.0005	0,05
Balance Limb explosive power	0,230	0.000/2=0.000	0,05

Source: Results of multivariate analysis of variable regression Speed, Limb explosive power on page attachment

Based on the table above, it can be concluded that the above equation is said to be feasible to use because the P value in the test is <0.05. From the table above it can be concluded that:

a. From the table of speed coefficients to the explosive power of leg muscles obtained t0 = 2.691 and P_value = 0.001 / 2 = 0.0005. The coefficient of Sub Structure Model 1 above, which states the direct influence of the Speed variable on the explosive power of the limbs of Patbanbu Pencak Silat College Athletes, Pekanbaru City, obtained a structural equation coefficient value of 0.264. While the significant value obtained for the Speed variable is 0.0005. Because the significant value is less than 0.05(0.0005<0.05), the decision H0 can be rejected.

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This means that there is a significant direct influence of Speed on muscle explosive power.

b. From the table of equilibrium coefficients to the explosive power of the limbs obtained t0 = 3.973 and P_value = 0.000 / 2 = 0.000. The coefficient of Sub Structure Model 1 above, which states the direct influence of the Balance variable on the explosive power of the limbs of Patbanbu Pencak Silat College Athletes, Pekanbaru City, obtained a structural equation coefficient value of 0.230. While the significant value obtained for the balance variable is 0.000. Because the significant value is less than 0.05 (0.000<0.05), the decision H0 can be rejected. This means that there is a significant direct influence of balance on the explosive power of the limbs.

Table 4. Substructure termination coefficient I

Type	R	R-Square	Adjusted R Square	Std. Error of the estiminate
1	0.324a	0.250	0,245	10.45

Source: the results of primary data processing in the appendix.

Table 5. The results of multivariate regression analysis of the structure of 2 variables of speed, balance of limb explosive power and on the ability of the front kick of athletes Patbanbu Pencak Silat College Pekanbaru City

Varabel	β	P-Value/sig	A
Speed Front kick ability	0,234	0.002/2=0.001	0,05
Balance Front kick ability	0,140	0.002/2=0.001	0,05
Muscle explosive power Front kick ability	0,724	0.001/2=0.001	0,05

Results of multivariate regression analysis of the structure of 2 variables of speed, balance of limb explosive power and on the ability of the front kick of athletes Patbanbu Pencak Silat College Pekanbaru City

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Based on the table above, it can be concluded that the above equation is said to be feasible to use because the P value in the test is <0.05. From the table above it can be concluded that:

a) From the table of speed coefficients to the ability of the front kick obtained t0 = 1.529 and P_value = 0.002 / 2 = 0.001. The value of the structural equation coefficient for the speed variable against the front kick ability of Patbanbu Pencak Silat College athletes in Pekanbaru city is 0.234 with a significant value obtained is 0.001. Because the significant value is less than 0.05 (0.001<0.05), the H0 decision can be rejected. This means that there is a direct influence that is significant on the ability of the front kick.

b) From the table of balance coefficients against the ability of the front kick obtained t0 = 3.905 and P_value = 0.002 = 0.001. The value of the structural equation coefficient for the balance variable against the front kick ability of Patbanbu Pencak Silat College athletes in Pekanbaru City is 0.140 with a significant value obtained is 0.001. Because the significant value is less than 0.05 (0.001<0.05), the H0 decision can be rejected. This means that there is a direct influence that reduces the explosive power of the limbs on the ability of the front kick.

c) From the table of the explosive power coefficient of the limbs against the ability of the front kick obtained t0 = 5.081 and P_value = 0.001 / 2 = 0.016. The value of the structural equation coefficient for the variable explosive power of leg muscles against the front kick ability of Patbanbu Pencak Silat College athletes in Pekanbaru City is 0.724 with a significant value obtained is 0.016. Because the significant value is less than 0.05 (0.016<0.05), the H0 decision can be rejected. This means that there is a direct influence that reduces the explosive power of leg muscles on the ability of the front kick.

Table 6. Coefficient of determination of substructure 2

Type	R	R-Square	Adjusted R Square	Std. Error of the estiminate
1	.796a	.633	.575	6.66246

results of primary dat processing in attachments

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Discussion

The results of this study revealed a significant relationship between speed, balance, leg muscle explosive power, and front kick ability in Pencak Silat athletes (Adyanto et al., 2018; Irawan et al., 2021; Purwanto &; Saputra, 2020; P. Widodo, 2018). Speed directly affects the explosive power of the limb muscles, with a regression coefficient of 26.4%, indicating that an increase in speed can contribute to an increase in the explosive power of the leg muscles. Similarly, balance also has a significant direct influence on the explosive power of leg muscles, with a regression coefficient of 23%. These results confirm the importance of developing speed and balance as fundamental physical components in increasing the explosive power of leg muscles, which directly impacts front kick performance (Halbatullah et al., 2019; Nandana et al., 2020; Suwirman, 2019).

The findings show that speed and balance also have a direct influence on front kick ability, although the direct influence of balance tends to be lower compared to speed (Mujahid &; Subekti, 2021; Ricky et al., 2021). Meanwhile, the explosive power of the leg muscles has the strongest direct influence on front kick ability, with a regression coefficient of 72.4%. These results show that the increase in speed, balance, and explosive power of the limb muscles directly contributes to the improvement of the front kick ability in Pencak Silat athletes. In addition, path analysis also revealed that part of the effect of speed and balance on front kick ability was explained through mediators of limb muscle explosive power, with contributions of 12.6% and 18.5%, respectively.

Overall, the results of this study confirm the importance of developing speed, balance, and explosive power of leg muscles in improving the ability of front kicks in Patbanbu Pencak Silat athletes, especially in the New Normal period. These findings can serve as a basis for coaches and coaches to design more effective and focused training programs, taking into account the physical

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JURNAL ILMU KEOLAHRAGAAN
Jendral A. Yani Street Lorong Gotong Royong 9/10 Ulu Palembang South Sumatera
email jurnal: jurnalhon@univpgri-palembang.ac.id
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aspects that have been identified as key factors in improving athletes' performance (A. Nugroho, 2020; H. Nugroho et al., 2021; Prayogo et al., 2021; Sutopo, 2021).

The interpretation of the results of this study provides a deeper understanding of the factors that affect the ability of the front kick in Patbanbu Pencak Silat athletes, especially in the context of the New Normal period. The finding that speed has a significant direct influence on the explosive power of leg muscles suggests the importance of exercise to increase movement speed in athletes. By increasing speed, athletes can effectively increase the strength and explosive power of leg muscles, which is a critical aspect in front kick technique. Therefore, training that focuses on developing movement speed is key in improving the athlete's ability to perform front kicks effectively (Lucius &; Daryanto, 2022; Mirfen, 2018).

Results that show the direct influence of balance on the explosive power of leg muscles confirm the importance of body stability in carrying out the front kick technique. Good balance allows athletes to stabilize their bodies while performing kicks, thus maximizing the transfer of force from the lower body to those kicks. Therefore, exercises aimed at improving balance, such as coordination and stabilization exercises, can help improve the athlete's ability to perform front kicks more effectively.

The results that show the direct influence of the explosive power of the leg muscles are very strong on the ability of the front kick confirms that the explosive power of the leg muscles is the main factor that determines performance in this technique. This shows that training focused on developing leg muscle strength and explosive power is crucial in improving athletes' ability to perform powerful and precise front kicks. Thus, the interpretation of the results of this study provides a clear direction for coaches and coaches to design more effective exercise programs, which pay attention not only to technical aspects, but also to the underlying physical factors.

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JURNAL ILMU KEOLAHRAGAAN
Jendral A. Yani Street Lorong Gotong Royong 9/10 Ulu Palembang South Sumatera
email jurnal: jurnalhon@univpgri-palembang.ac.id
situs web: http://www.univpgri-palembang.ac.id

CONCLUSION

From the results of the research presented, it can be concluded that the speed, balance, and explosive power of the leg muscles significantly affect the ability of the front kick in Patbanbu Pencak Silat athletes. This confirms that the development of these physical aspects is key in improving front kick performance, especially in facing the challenges of the New Normal period. By improving movement speed, body balance, and leg muscle strength, athletes can effectively improve their ability to perform front kicks with greater precision and strength. Therefore, to achieve optimal results in competition, it is important for coaches and coaches to design training programs focused on developing these physical aspects, thus helping athletes reach their maximum potential in mastering front kick techniques.

In addition, this study also emphasizes the importance of integration between physical and technical factors in the development of the ability of Pencak Silat athletes. Although this study highlights the important role of speed, balance, and leg muscle strength, it should not be overlooked that technical factors such as correct kick technique and match strategy also have a significant impact on athletes' performance. Therefore, to achieve comprehensive progress in this sport, there needs to be a holistic approach that includes the development of physical and technical aspects simultaneously. Thus, this conclusion provides a broader understanding of the complexities of achieving excellence in Pencak Silat, as well as highlighting the importance of an integrated approach in training athletes to achieve optimal performance.

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JURNAL ILMU KEOLAHRAGAAN
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email jurnal: jurnalhon@univpgri-palembang.ac.id
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