

THE EMPHASIS OF EXPLOSIVE POWER, FLEXIBILITY, AND MOTIVATION JUDGING FROM BACK KICK SPEED ON BKMF ATHLETES

Muhammad Yusuf Hanas^{1*}, Imam Suyudi², Muh. Adnan Hudain³, Andi Ihsan⁴, Ahmad Adil⁵

^{1, 2, 3, 4, 5} Universitas Negeri Makassar, Indonesia

Article Info

Article history:

Received January 02, 2024

Revised February 25, 2024

Accepted March 22, 2024

Keywords:

Athletes;

Explosive Leg Power;

Flexibility;

Motivation;

Back Kick Speed.

ABSTRACT

This research objective is to determine the influence of explosive power, flexibility, and motivation in terms of back kick speed in the pencak silat sport. This research is a type of correlational research. The population of this study was all BKMF pencak silat athletes at Makassar State University, with a total research sample of 15 athletes using the Total Sampling method. The data analysis technique used is a descriptive analysis technique using the SPSS Version 21.00 system at a normal level of α 0.05. Judging from the results of the data analysis, the researcher can conclude that: (1) Explosive power is influenced by motivation in State University BKMF pencak silat athletes Makassar, with a p-value of 0.005. (2) Flexibility is influenced by motivation in Makassar State University BKMF pencak silat athletes with a p-value of 0.004. (3) Explosive power influences the back kick with a p-value of 0.015. (4) Flexibility influences the back kick with a p-value of 0.016. (5) Motivation influences the speed of the back kick with a p-value of 0.001. (6) Leg muscle explosive power through motivation influences the speed of the straight kick with a p-value of 0.000005, and (7) abdominal muscle strength through motivation influences the speed of the straight kick with a p-value of 0.00004.

Copyright © 2024 ETDCI.
All rights reserved.

Corresponding Author:

Muhammad Yusuf Hanas
Universitas Negeri Makassar, Indonesia
Email: yusuf.hanas01@gmail.com

1. INTRODUCTION

A branch of racing sports known as pencak silat emerged from the ancestors of the Indonesian nation (de Grave, 2016; Mulyana & Lutan, 2021). The establishment of the organizational head of silat led to the first use of the term "silat" in Indonesia (IPSI). Previously, in Sumatra, it was known as Silat, while in Java, it was only known as Peak. This adult silat peak is becoming more popular and more and more loved by society, not only in Indonesia but also in the country.

When faced with numerous opponents, the back kick stands out as the fastest and strongest kick. A back kick has good coordination of motion, so it touches the target or

opponent quickly with a strong force (Sin & Ihsan, 2020; Aristiyanto et al., 2021; Facal, 2022). One of the Indonesian wrestlers who succeeded in bringing Indonesia's name to international games like Asian games and so on, and who had a back kick as his main weapon, was Iqbal Candra. He was an eastern Kalimantan wrestler who was famous for his back kick and, as often as possible, earned points in the ring using such a kick. A biomechanical analysis reveals that the rear kick necessitates a robust horse, lifts the trunk, swiftly turn the waist back, lands forcefully towards the target, and then return to the horse's position. From a physiological perspective, this kick demands excellent threshold muscle explosiveness and proper formation (Mulyana & Lutan, 2021).

A person's ability to exert maximum force in a short amount of time is known as the explosive force of the spinal muscle. Explosive power is the ability of a muscle or a group of muscles to cope with heavy loads with high strength and speed in one complete movement (Kumaidah, 2012; Ediyono & Widodo, 2019). Muscular power is a person's ability to exert maximum force with effort in a short time. The more explosive power the shaver's muscle part possesses, the faster and stronger the rear kick will be (Manopo et al., 2021). A quick and strong punch can make it difficult to avoid or beat an opponent.

Sliding power is the effectiveness of an individual in adapting to any activity or activity with muscle flexion and extensive joint motion space (de Grave, 2016; Suryani, 2023). It would be very easily characterized by the degree of joint flexibility on the entire body surface. A good body should be in good shape anyway. Physical exercises, particularly those focused on proliferation and formation, can achieve this. Factors affecting formation are age and physical activity. In older age, reduced formation is due to reduced muscle activity as a result of reduced exercise.

Motivation is the mental impulse that moves and directs human behavior, including learning behaviour (Deci & Ryan, 2013; Fathabadi et al., 2021; Tolman, 2023). When it comes to learning activities, we can define motivation as the entire force within the student that drives the activity, ensures its survival, and guides study activities towards the student's desired goal (Spittle & Byrne, 2009; Babenko & Mosewich, 2017; Roberts et al., 2018; Ramadhan & Effendy, 2021).

The observations reveal that BKMF athletes and silat recorders at the State University of Makassar struggle with producing a back kick to its full potential. Looking at the results of the athletes' training, the researchers found that there were three factors that influenced the explosive strength of the muscles of the limbs: strength and motivation. Many athletes still struggle to lift their trunks at their maximum speed, but their rapid trunk crushing, lack of power, and lack of enthusiasm during each training session are noteworthy. While such a training program greatly enhances athletes' abilities, the trainer must balance the explosive strength of the limb muscles with the athlete's form. The slider often notices this problem, as the athlete's formation can bolster their strength during jumps. Besides, there is a lack of motivation that students have when playing Pencak Silat, both instrumentally and extrinsically. The lack of impulse to self-defeat students, especially when performing a back kick, significantly hinders their performance in Pencak Silat.

The innovation of this research is to add the physical condition variables of explosive power, determination, and psychological aspects of motivation. This study aims to achieve the ability to kick back less than the maximum, which can serve as an evaluation tool for BKMF athletes in Pencak Silat, enabling them to support athletes in performing at their peak.

Based on the above problems, the physical elements of explosive power, determination, and motivation are very closely related to the ability to kickback athletes. So the author wishes to conduct research as the final task in order to find out how far the problem.

2. METHOD

This research is a type of correlational research (Miles & Shevlin, 2000; Wherry, 2014; Seeram, 2019). Data analysis techniques used in testing research hypotheses are (1) path analysis, (2) simple correlation and (3) determination coefficient. Requirement submission is a classical assumption test consisting of a normality test using the Liliefors and linearity tests as a path analysis requirement. Additionally, we perform a reasonability analysis, limiting the influence of free variables to 0.05 on both directly and indirectly bound variables. The research pattern is as follows in figure 1 (Myers et al., 2013; Krause, 2018):

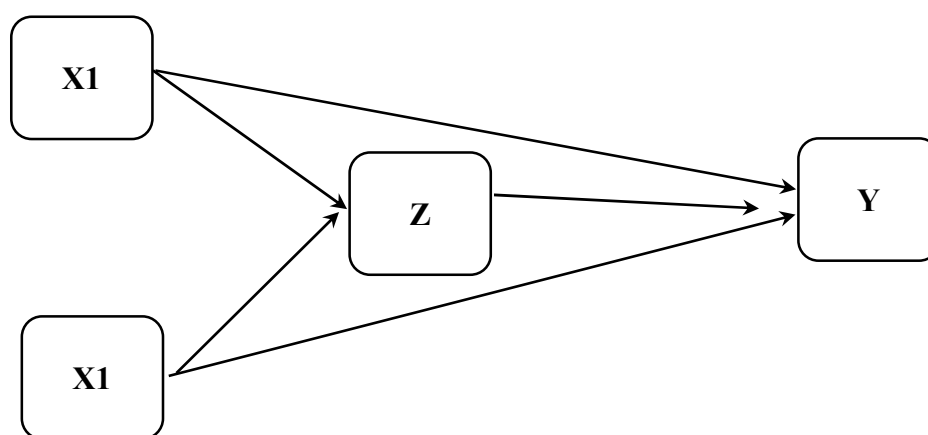


Figure 1. Research Design

Description:

X1 = Strength of explosion of the muscles of the limb

X2 = Formation

Z = Motivation

Y = Back jump speed

The study involved 15 BKMF athletes at Makassar State University as a population and a sample. The researchers conducted research based on the symptoms that were the subject of the study. The researchers collected data from evaluations carried out during the research process. Data analysis is done using SPSS 27.0.

3. RESULTS AND DISCUSSION

Results

Descriptive Test

Table 1. Data Descriptive Analysis Summary

Variabel	N	Minimum	Maximum	Mean	Std. Deviation
Leg muscle explosive power(X1)	15	28.00	50.00	39.9333	8.09291
Flexibility(X2)	15	3.00	33.00	16.4000	12.07003
Motivation (Z)	15	98.00	148.00	1.2987	14.40172
Back kick speed(Y)	15	8.40	11.35	10.0140	0.97301

The table above provides a summary of each variable's data, as shown below:

- 1) Muscle blast strength athlete Silat Puncher BKMf Pencak Silat State University Makassar obtained a total average value of 39.9333 cm, minimum data of 28.00cm, maximum data of 50.00 cm, and a standard deviation of 8.09291 cm.
- 2) Selection of the silatpuncher BKKMF Punjab Silat State University Makassar received a total mean value of 16.4000 cm, minimal data of 3.00 cm, max data of 33.00 times, and standard deviations of 12.07003 cm.
- 3) Motivation: athletes silatpin BKMM Punjab Silat State University Makassar obtained a total average rating of 1.2987, minimum data of 98.00, maximum data of 148.00, and standard deviation of 14.40172.
- 4) The speed of the pivot pivot silat pivot at BKRMf Jawab Silate State University Macassardi yielded a total mean score of 1,2987 seconds, with a minimum value of 8.40 seconds, a maximum standard deviation of 11.35172, and a deviation of 14.402 seconds.

Normality Test

Table 2. A summary of The Normality Test Results

Variabel	Asymp. Sig (2 tailed)	Conclusion
Leg muscle explosive power(X1)	0.923	Normal
Flexibility(X2)	0.607	Normal
Motivation (Z)	0.705	Normal
Back kick speed (Y)	0.933	Normal

Based on the results of the normality test obtained in Table 4.2, the following are:

- 1) We can confirm that the trigger data distribution is normal if the trigger muscle has a significant rate or probability value above 0.05 (0.923 is greater than 0.05).

- 2) If it can be determined that a significant level or probability value is above 0.05 (0.607 is greater than 0.05), then it is possible to confirm that the distribution of trigger muscle data is normally distributed.
- 3) We can fix motivation to ensure a normal distribution of the spherical muscle's explosive power data if we find it at a level or probability value above 0.05 (0.705 is higher than 0.05).
- 4) Obtained for the speed of the reverse kick at a significant rate or the probability values above 0.05 (0.933 is larger than 0.05).

Linearity Test

Table 3. A Summary of The Linearity Test Results

Variabel	Defiation from Linearity (F)	Sig	Conclusion
X1 with Z	7.055	0.838	Linear
X2 with Z	2.983	0.240	Linear
X1 with Y	0.941	0.572	Linear
X2 with Y	4.228	0.731	Linear
Z with Y	4.228	0.531	Linear

The above table shows that the linearity test results of the explosive muscle explosion variable with the motivation variable yielded a linearization value of 7.055. Given that the data linearity value is greater than 0.05 ($7.055 > 0.05$), we can conclude that there is a linear relationship between the explosion force and motivation

- 1) The linearity test result between the shape and motivation variables yielded a linearization value of 2.983. Given that the data linearity value is greater than 0.05 ($2.983 > 0.05$), we can conclude that a linear relationship exists between shape and motivation.
- 2) We concluded that there is a linear relationship between the explosion force of the trunk muscle and the rate of the back kick, based on the linearity test results of a variable of the explosive force of the muscle and a variable of the speed of the reverse kick, which yielded linearities of 0.941.
- 3) The linearity test result between the shape variable and the reverse jump speed variable yielded a linearization value of 4.228. Given that the data linearity value is greater than 0.05 ($4.228 > 0.05$), we can conclude that there is a linear relationship between shape and reversal speed.
- 4) The linearity test results between the motivation variable and the reverse jump speed variable yielded a linearization value of 4.228. Given that the data linearity value is greater than 0.05 ($4.228 > 0.05$), we can conclude that a linear relationship exists between motivation and reverse kick speed.

Hypothesis Testing

Tabel 4. Substructure Model Test 1

Hypothesis	R-Square	Standardized Coefficients Beta	probabilitas	Conclusion
Leg muscle explosive power(X1) with Motivation (Z)	0.626	0.252	0.005	Significant
Flexibility (X2) with Motivation (Z)	0.626	0.161	0.004	Significant

According to the table above, the R-Square value is 0.626, indicating that leg muscle explosive power and flexibility simultaneously contribute 62.6% to the explanation of changes in the motivation variable, with other variables outside the model accounting for the remaining 52.6%.

Tabel 5. Substructure Model Test 2

Hypothesis	R-Square	Standardized Coefficients Beta	Probabilitas	Conclusion
Leg muscle explosive power(X1) Back kick speed(Y)	0.466	0.340	0.015	Significant
Flexibility (X2) Back kick speed(Y)	0.466	0.257	0.007	Significant
Motivation (Z) Back kick speed(Y)	0.466	0.010	0.001	Significant

Based on the table above, the R-Square value is 0.466, and the significance value for variables X1, X2, and Z, respectively, is 0.015, 0.007, and 0.001. Because the significance values of X1, X2, and Z are <0.05, they are considered significant. To analyse how much influence other variables outside the model have on motivation (ε2), it can be determined in the following way:

$$\begin{aligned} \epsilon^2 &= \sqrt{(1-R^2)} \\ &= \sqrt{(1-0.466)} \\ &= 0,737 = 73,7\% \end{aligned}$$

So the value (ε1) of the path coefficient of another variable on the back kick speed is 73.7%. So the path equation is as follows:

$$\begin{aligned} Y &= \rho_{yx1} + \rho_{yx2} + \rho_{yZ} + \epsilon^2 \\ Y &= 0.340 X1+ 0.257 X2 + 0.010 Z + 0.737 \end{aligned}$$

We obtained two models that were considered significant after carrying out several stages of model testing, paying attention to the level of significance of each variable. The two models in question were substructures 1 and 2. Combining the two models resulted in a structure, as illustrated in figure 2.

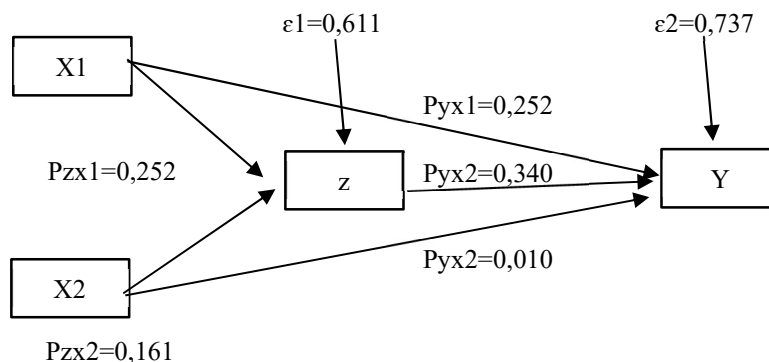


Figure 2. Model of test results for substructure 1 and substructure 2

From the path diagram above, the following structural equation can be created:

$$\begin{aligned}
 Z &= \rho_{Zx_1}X_1 + \rho_{Zx_2}X_2 + \rho_Z\varepsilon_1 \\
 Z &= 0,252 X_1 + 0,161 X_2 + 0,611 \varepsilon_1 \\
 Y &= \rho_{yZ}Z + \rho_{yx_1}X_1 + \rho_{yx_2}X_2 + \rho_Y\varepsilon_2 \\
 Y &= 0,340 Z + 0,257 X_1 + 0,010 X_2 + 0,737 \varepsilon_2
 \end{aligned}$$

Discussion

The hypothesis testing section's test results for all hypotheses lead to the following conclusion:

- 1) Motivation directly influences muscular explosive power in BKMF Pencak silat athletes at Makassar State University.

Based on the results of testing the first hypothesis, it appears that there is a 46.3% direct influence between muscle explosive power and motivation. These results show that a fighter's explosive muscle power will influence their level of motivation. In other words, the better the explosive power of a fighter's muscles, the higher the level of motivation.

Almost all sports require explosive power, a crucial component of physical condition. In pencak silat, the athlete uses dynamic explosive power to perform a back kick. During a back kick, the athlete endeavors to direct the kick towards the opponent's intended target. Strength and speed correlate with explosive power.

- 2) At Makassar State University, the motivation of BKMF pencak silat athletes directly influences flexibility.

We tested the second hypothesis, and the results show that motivation directly influences flexibility by 62.6%. The analysis reveals that flexibility is typically required to enhance movement. To increase pressure or provide reinforcement during a back kick, flexibility is required. Flexibility is a person's ability to use a wide range of movements through the joints optimally.

- 3) The explosive power of the leg muscles has a direct effect on the speed of the back kick in BKMF pencak silat athletes at Makassar State University.

According to the results of testing the third hypothesis, muscle explosive power has a direct effect on back kick speed of 11.6%. Back kick speed is a leg movement that coordinates the movement backwards by lifting the leg as quickly as possible and then turning it towards the target. Researchers studying the anatomy and physiology of a back kick in pencak silat have discovered that lifting the tibia and fibula causes the femoral abductor muscle to contract at the thorax level. This raises the fibula and femur to a 90-degree angle. Subsequently, the body rotates 90 degrees to align the tibia, fibula, and femur in a straight line towards the target.

Good explosive power in the leg muscles is necessary to support the speed required for this kick, which involves raising the leg as quickly as possible. In the sport of pencak silat, the explosive power of the leg muscles is, of course, a very influential factor because it is the explosive power of the leg muscles that makes movements, especially leg movements such as kicks, become faster.

4) Flexibility has a direct effect on the speed of the back kick in BKMF pencak athletes at Makassar State University.

According to the test results for the fourth hypothesis, it appears that flexibility has a 46.6% direct effect on back kick speed. Flexibility is critical in pencak silat sports, particularly when executing kicks. You will also produce good kicks because flexibility increases strength or acts as reinforcement when performing back kicks in pencak silat sports.

5) Motivation has a direct effect on the speed of the back kick in BKMF pencak silat athletes at Makassar State University.

Based on the results of testing the fifth hypothesis, it shows that motivation has a direct effect on back kick speed of 33.5%. In pencak silat sports, motivation is crucial for training, learning, and competitions. Because of the mental drive that exists within an athlete to carry out certain activities to achieve a goal, a strong mental drive is essential for every pencak silat athlete, as it enables them to perform back kicks with precision and speed. This aligns with Maslow's perspective (Euis Karwati & Donni J.P., 2014: 173) on the need for achievement theory, which asserts that a person must achieve significant milestones, master diverse skills, maintain high standards, and be capable of overcoming new challenges to gain recognition. Their success stems from the recognition of their achievements. In other words, the better the motivation of the fighter, the better the kicks produced by the fighter; therefore, a trainer or the fighter himself must increase his motivation if he wants his kicks to be good by providing drive verbally or nonverbally. Direct motivation can take the form of verbal praise, while behavioral motivation can take the form of setting an example for the athlete to follow and appreciate. For example, if the coach performs a good kick, he sets an example for the athlete to follow. Bonuses can also serve as a form of motivation, boosting training enthusiasm. Finally, motivation can also take the form of imagination, encouraging athletes to observe, pay attention, and envision professional athletes on platforms like YouTube for imitation and application.

6) The explosive power of the leg muscles through motivation influences the speed of the back kick in BKMF pencak silat athletes at Makassar State University.

Based on the results of testing the sixth hypothesis, it shows that the explosive power of the leg muscles through motivation influences the speed of the back kick by 61.1%. In the pencak silat sport, executing a back kick requires explosive power in the leg muscles to increase speed. Motivation is essential for enhancing the back kick's ability, as it necessitates strong encouragement to carry out the activity. Therefore, it requires good motivation.

7) Flexibility through motivation influences the speed of back kicks in BKMF pencak silat athletes at Makassar State University.

4. CONCLUSION

We can draw the following conclusions from the research results based on analysis and hypothesis testing:

1. There is a direct positive influence between explosive power and motivation in BKMF pencak silat athletes at Makassar State University.
2. There is a direct positive influence between flexibility and motivation in BKMF pencak silat athletes at Makassar State University.
3. There is a direct positive influence of explosive power on the ability of back kicks in BKMF pencak silat athletes at Makassar State University.
4. There is a direct positive influence between flexibility and back kick ability in BKMF pencak silat athletes at Makassar State University.
5. There is a direct positive influence between motivation and back kick ability in BKMF pencak silat athletes at Makassar State University.
6. There is a positive influence of explosive power through motivation on back kick ability in BKMF pencak silat athletes at Makassar State University.
7. There is a positive influence of flexibility through motivation on back kick ability in BKMF pencak silat athletes at Makassar State University.

Based on the results of testing the seventh hypothesis, it shows that flexibility through motivation influences back kick speed of 73.7%. Pencak Silat athletes require flexibility because it often necessitates lifting during kick execution. Good motivation is necessary to kick on target, maintain correct form and speed, and carry out the desired movements with strong encouragement.

REFERENCES

- Aristiyanto, A., Nilawati, I., Setiawan, F. E., & Fadly, S. (2021). Analysis of the Physical Condition of the Pencak Silat Athletes. In *The 1st International Conference on Research in Social Sciences and Humanities (ICoRSH 2020)* (pp. 903-908). Atlantis Press.
- Babenko, O., & Mosewich, A. (2017). In sport and now in medical school: examining students' well-being and motivations for learning. *International Journal of Medical Education*, 8, 336.
- Deci, E. L., & Ryan, R. M. (2013). *Intrinsic motivation and self-determination in human behavior*. Springer Science & Business Media.
- de Grave, J. M. (2016). The Standardisation of Pencak Silat: Javanisation. *The Fighting Art*

- of Pencak Silat and its Music: From Southeast Asian Village to Global Movement*, 5, 45.
- Ediyono, S., & Widodo, S. T. (2019). Memahami makna seni dalam pencak silat. *Panggung*, 29(3).
- Facal, G. (2022). Biopolitics of Invulnerability: The regionalist martial arts groups in the Malay world. *Indonesia and the Malay World*, 50(147), 234-251.
- Fathabadi, J., Fatemi, A. H., & Pishghadam, R. (2021). How might one live? A social theory of human motivated behavior. *Human Arenas*, 4, 501-517.
- Krause, M. S. (2018). Associational versus correlational research study design and data analysis. *Quality & Quantity*, 52(6), 2691-2707.
- Kumaidah, E. (2012). Penguatan eksistensi bangsa melalui seni bela diri tradisional pencak silat. *Humanika*, 16(9).
- Manopo, E. B., Mandagi, H. S., & Sunkudon, D. (2021). Pengaruh Gaya Mengajar Latihan Terhadap Keterampilan Teknik Tendangan Dalam Pencak Silat. *PHYSICAL: Jurnal Ilmu Kesehatan Olahraga*, 2(1), 9-13.
- Miles, J., & Shevlin, M. (2000). Applying regression and correlation: A guide for students and researchers.
- Mulyana, B., & Lutan, R. (2021). The lost inner beauty in martial arts: a pencak silat case. *The International Journal of the History of Sport*, 37(12), 1172-1186.
- Myers, J. L., Well, A. D., & Lorch Jr, R. F. (2013). *Research design and statistical analysis*. Routledge.
- Ramadhan, R., & Effendy, F. (2021). The Effect of Sport Education on the Learning Motivation of Junior High School Students in Physical Education. *Kinestetik: Jurnal Ilmiah Pendidikan Jasmani*, 5(3), 472-481.
- Roberts, G. C., Nerstad, C. G., & Lemyre, P. N. (2018). Motivation in sport and performance. In *Oxford research encyclopedia of psychology*.
- Seeram, E. (2019). An overview of correlational research. *Radiologic technology*, 91(2), 176-179.
- Sin, T. H., & Ihsan, N. (2020). The effectiveness of Pencak Silat to change teenage personalities. *Jurnal Konseling Dan Pendidikan*, 8(1), 1-8.
- Spittle, M., & Byrne, K. (2009). The influence of sport education on student motivation in physical education. *Physical education and sport pedagogy*, 14(3), 253-266.
- Suryani, A., Sulaiman, I., Widiastuti, W., Subandi, O. U., & Taufik, M. S. (2023). Model Of Learning Front Kick Skills In Pencak Silat. *ACTIVE: Journal of Physical Education, Sport, Health and Recreation*, 12(3).
- Tolman, E. C. (2023). *Behavior and psychological man: essays in motivation and learning*. Univ of California Press.
- Wherry, R. J. (2014). *Contributions to correlational analysis*. Academic Press.