HALAMAN OLAHRAGA NUSANTARA (HON)
Jurnal Ilmu Keolahragaan

Volume 9 No I
Tahun 2026

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

ANALYSIS OF THE PHYSICAL CONDITION OF PENCAK SILAT EXTRACURRICULAR STUDENTS

Abdul Haris Musthofa[1], Sugiarto[2]
Universitas Negeri Semarang[1,2]
harismusthofa@students.ac.id[1], sugiarto.edu@mail.unnes.ac.id[2]

Abstract
This study aims to analyze the physical condition of students who are members of the pencak silat extracurricular at SMA N 1 Bergas. The focus of the study includes three main components of physical fitness, namely speed, leg muscle explosiveness, and arm muscle explosiveness. This study used a quantitative descriptive method involving 26 students as samples. The instruments used consisted of a 30-meter sprint test to measure speed, standing board jump for leg muscle explosiveness, and two hand medicine ball put for arm muscle explosiveness. The results showed that most students had good to very good physical conditions. The average sprint running time was 4.47 seconds, the average standing board jump distance was 236.73 cm, and the average medicine ball throw reached 5.56 meters. However, some students were found in the fair to poor category, indicating the need for more targeted training interventions. The conclusion of this study is that in general, the biomotor condition of pencak silat students is good, but special training strategies are needed to improve the performance of students who are still below the standard. These findings are expected to be a reference in the preparation of physical training programs in the school environment.

Keywords: *Pencak Silat; Physical Condition; Speed; Muscle Explosive Power*

Submitted : 06th of August 2025
Accepted : 17th of December 2025
Published : 23th of December 2025

Correspondence Author: Abdul Haris Musthofa, Universitas Negeri Semarang, Indonesia.
E-Mail: harismusthofa@students.ac.id

DOI http://dx.doi.org/10.31851/hon.v9i1.19827

INTRODUCTION

Sport is a physical activity that is carried out in a planned and structured manner with the aim of improving physical fitness, body health, and individual motor abilities (Taqwim et al., 2020).Through sports, students not only gain fitness benefits, but also learn about discipline, teamwork, and sportsmanship (Prasetyo et al., 2018). Sport is an important aspect of people's social life that cannot be separated from daily activities (Hanief & Purnomo, 2019). Its role is not only limited to improving physical fitness or individual health, but also has a major contribution in shaping positive social and cultural values. Through sports, one can learn about discipline, responsibility, cooperation, and sportsmanship, which

HALAMAN OLAHRAGA NUSANTARA
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

indirectly play a role in shaping the personal and collective character of society (Majid, 2020). Participation and achievement in sporting events at regional, national and international levels can increase individual and community self-confidence, strengthen national identity, and foster a sense of pride in the country (Aditia et al., 2022). Therefore, sport is not only seen as a physical activity, but also as an important means to strengthen the spirit of unity, strengthen national identity, and make Indonesia proud in the eyes of the world through sporting achievements.

One form of sports activity that is in great demand in the school environment is pencak silat. Pencak silat is a traditional Indonesian martial art that combines elements of art, fighting techniques, and physical and mental strength (Ridho Setiawan et al., 2022). In its development, pencak silat has become a sport that is competed in various national and international championships, and has become an important part of the nation's cultural heritage (Sutoyo, 2022). The nation's cultural heritage (Sutoyo, 2020). Pencak silat activities require mastery of good techniques and excellent physical condition to be able to carry out various movements such as attacks, parries, evasions, and slams effectively (Sinulingga et al., 2023). In everyday life, pencak silat skills can support a healthy lifestyle, increase awareness of potential dangers, and strengthen the body's resistance to physical stress arising from routine activities. Therefore, pencak silat is not only relevant as an achievement sport, but also as an important physical and spiritual necessity in maintaining and improving the overall quality of life of modern humans.

Physical condition has a very important role in supporting athlete performance, including for students who take part in extracurricular pencak silat. Physical condition is one of the fundamental elements in the physical fitness system that cannot be separated from other components, both in terms of achievement and in efforts to maintain or preserve it (Prima et al., 2020). Each element in body fitness is interrelated and forms a unified whole, so that physical conditions cannot stand alone without support from other aspects such as technique, mentality, and training strategies (Rohmah & Muhammad Nur, 2021). In the context of sports, especially for an athlete, physical condition describes the body's readiness to carry out

HALAMAN OLAHRAGA NUSANTARA
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

activities efficiently, safely and effectively. Optimal physical condition has a major influence on the quality of athlete performance, because it is directly related to the strength, endurance, speed, agility, and flexibility needed in every sport (Aditia et al., 2022). Athletes with excellent physical condition will be better able to face the pressure of competition, reduce the risk of injury, and maintain peak performance for a longer period of time (Ayu & Setyaningrum, 2019). Therefore, elements of physical fitness such as speed, strength, muscle explosiveness, agility, and endurance are the basis that every fighter must have. Speed is one of the basic components of physical fitness that is very influential in the sport of pencak silat (Sutopo & Misno, 2020).

Speed is needed to make sudden attacks, avoid opponent attacks, and move quickly in a favorable position. To measure this aspect practically and objectively, the 30-meter sprint test is used because it can reflect the body's acceleration ability over short distances which is often encountered in match situations (Mustakim et al., 2019). Speed is an important component of physical ability that refers to a person's capacity to respond to stimuli and perform a movement or series of movements in a very short time (Fauzi et al., 2020). In the context of pencak silat, speed not only functions as a support in attack or defense, but also becomes an important basis in the implementation of techniques such as kicks, punches, evasions, parries, and various other tactical movements. The higher the level of speed of an athlete, the greater his ability to master the rhythm of the match, control the situation, and complicate the opponent's movement in defense (Sutopo & Misno, 2020). Therefore, speed is one of the crucial factors that must be trained optimally in preparation for pencak silat matches.

Leg muscle explosiveness is also a crucial indicator in pencak silat (Gustama et al., 2021). High kick movements, jumps to avoid opponents, and explosive changes in position really require leg muscle strength. The standing broad jump test or long jump test from a place is one method that is often used to assess leg muscle explosiveness directly and efficiently, and is widely applied in various physical fitness studies. Muscle explosiveness is a physical ability that is the result

HALAMAN OLAHRAGA NUSANTARA
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

of a combination of two main elements, namely strength and speed (Fahrurozi & Syahara, 2019). Explosive power can be interpreted as the capacity of muscles to produce energy quickly in a short time to overcome a load through contractions that take place at a high tempo (Gede Adi Mandala Putra et al., 2022). Strength itself reflects the ability of the muscles to lift, throw, reject, or push a load, while speed shows the extent to which a muscle is able to contract quickly and efficiently. In other words, explosive power occurs when the muscles are not only strong in overcoming the load, but also able to do so at maximum speed (Fauzi et al., 2020). Therefore, the combination of muscle strength and contraction speed is the main indicator that describes how much explosive power a person has.

Another physical component in pencak silat is arm muscle explosiveness. Arm muscle explosiveness is the ability of the muscles in the arm to produce maximum power in a short time (Aprisandy et al., 2019). This ability is a combination of strength and speed in performing explosive muscle contractions, such as in high- intensity throwing, pushing, or hitting activities (Muhammad, n.d.). In the sport of pencak silat, this component is vital because many techniques require fast and powerful movements, especially when attacking, parrying, or pushing at close range. Therefore, increasing arm muscle explosive power is an essential part of pencak silat physical training to support technical performance and improve the ability to compete in matches (Hasyyati1 et al., 2021). Punching, pushing, blocking, and even some submission techniques involve the strength and speed of the arm muscles in a short period of time. To measure this aspect, the two hand medicine ball put test is used, which throws a medical ball with both hands forward. This instrument is considered capable of describing the explosive strength of the arm functionally and in accordance with the needs in pencak silat activities.

SMA N 1 Bergas is one of the high schools that is active in developing extracurricular activities, including pencak silat. Pencak silat extracurricular activities at this school aim to form tough student characters and improve self-defense skills and physical condition. However, until now there has been no in-depth study of the physical condition of students who are members of these

HALAMAN OLAHRAGA NUSANTARA
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

activities. In fact, an evaluation of physical fitness aspect is needed to adjust the training program to the students' physical abilities.

This study was conducted to analyze the physical condition of students who are members of the pencak silat extracurricular at SMA N 1 Bergas. This study used a quantitative descriptive approach with a sample of 26 students, and used three main instruments, namely the 30-meter sprint run to measure speed, standing broad jump for leg muscle explosiveness, and two hand medicine ball put for arm muscle explosiveness. The data obtained will be analyzed using descriptive statistics to describe the physical condition of students objectively.

With this research, it is hoped that the results of the analysis can provide a real picture of the physical abilities of pencak silat students, and become the basis for sports teachers and coaches in developing more targeted and effective training programs. In addition, this research can also contribute to the development of sports science at the secondary school level.

METHOD

This research is included in the type of quantitative research using descriptive methods, which aims to describe the physical condition of pencak silat athletes who are members of extracurricular activities at SMA N 1 Bergas. The research was conducted in February 2025. The population in this study included all male pencak silat athletes who were actively registered as pencak silat extracurricular participants at the school. The sample is part of the population that has certain characteristics. The sample is part of the population or represents the population studied and taken as a source of data and can represent the entire population (Samsu, 2021). Based on this, the sample selection was carried out using purposive sampling technique, which is a sampling technique based on certain considerations. In the context of this study, the sample was selected based on the age range of 16 to 20 years, so that from the existing population, 26 male pencak silat athletes who actively participate in training are obtained as research samples.

Speed

Speed data collection instruments and techniques apply the 30 meter run test as for the normalization standard for the 30 meter sprint.

HALAMAN OLAHRAGA NUSANTARA
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

Table 1. Normalization Standards for 30 meter *sprints*

Category	Score
Very good	3,58 - 3,91
Good	3,92 - 4,34
Fair	4,35 - 4,72
Less	4,73 - 5,11
Very Poor	5,12 - 5,50

(Arsil, 2010)

Limb Muscle Explosive Power

Instruments and data collection methods for measuring leg muscle explosive power using the standing broad jump test, with reference to the normalization standards that apply to the test.

Table 2. Normalization Standards for Standing Broad Jump assessment

Category	Score (cm)
Perfect	>250
Excellent	241 - 250
Good (above average)	231 - 240
Medium (below average)	221 - 230
Poor (below average)	211 - 230
Very Poor	<210

(Irawadi, 2014)

Arm Muscle Explosive Power

Data collection to measure arm muscle explosive power is carried out through the two hand medicine ball push test, with reference to the normalized assessment standards that have been set for the test.

Table 3. Normalized Standard Two Hand Medicine Ball-Push Assessment

Category	Scorr (m)
Very Good	>6,23
Good	5,38 - 6,22
Fair	4,53 - 5,37
Deficient	3,68 - 4,52
Very Poor	2,63 - 3,67

(Nurhasan, 2005)

RESULT AND DISCUSSION

This study was conducted on 26 pencak silat extracurricular students from SMA N 1 Bergas. The main purpose of this data collection is to determine the physical condition of the students, which includes the components of speed, leg muscle explosiveness, and arm muscle explosiveness. Each component was

HALAMAN OLAHRAGA NUSANTARA
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

measured using standardized test instruments. Overall, the measurement results show that the pencak silat students at SMA N 1 Bergas have a fairly good physical condition in terms of speed, leg muscle explosiveness, and arm muscle explosiveness. However, there were variations in performance among the students indicating the need for a training approach tailored to their individual abilities.

Table 4. Results of Analysis of Physical Condition of Extracurricular Students of SMA N 1 Bergas

Instrument	N	Min	Max	Mean	Std. Deviation
Speed (30m Sprint Run)	26	3,58	5,90	4,47	0,65
Explosive Muscle (Standing Board Jump Test)	26	211	259	236,73	12,35
Arm Muscle Explosive Power (Two Hand Medicine Ball Put)	26	3,68	6,50	5,56	0,73

The results of measuring speed using the 30-meter sprint test showed that the fastest time achieved by students was 3.58 seconds, while the slowest time reached 5.90 seconds. The average value of sprint running time is 4.47 seconds with a standard deviation of 0.65 seconds. This shows that there is a variation in the level of speed between students, although most are in the fairly competitive time category.

In the measurement of leg muscle explosive power through the Standing Broad Jump test, the results showed that the minimum jump distance achieved was 211 cm, while the maximum distance reached 259 cm. The average jump value was 236.73 cm with a standard deviation of 12.35 cm. These results reflect the explosive ability of the students' leg muscles which varies, but in general is in the good category.

Meanwhile, the arm muscle explosive power test using medicine ball aids (Two-Hand Medicine Ball Put) showed that the shortest throwing distance achieved by students was 3.68 meters and the farthest distance was 6.50 meters. The average throwing distance was 5.56 meters with a standard deviation of 0.73 meters. This data indicates that most students have arm muscle strength that supports the needs of pencak silat sports.

HALAMAN OLAHRAGA NUSANTARA
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

Table 5. Distribution of Speed Levels of Pencak Silat Students at SMA N 1 Bergas

Classification	Frequency	Percentage	Category
4'06-4'50	5	19%	Excellent
4'51-4'96	9	35%	Good
4'97-5'40	6	23%	Fair
5'41-5'86	4	15%	Less
5'86-6'30	2	8%	Very poor

Based on the results of the speed test measured through the 30 meter sprint for 26 pencak silat students, the results of the value distribution are as follows: 5 students (19%) are in the "Excellent" category with a travel time between 4'06 to 4'50 seconds. Then, 9 students (35%) are in the "Good" category with a travel time between 4'51 to 4'96 seconds, 6 students (23%) showed "Fair" results, which ranged from 4'97 to 5'40 seconds. A total of 4 students (15%) were in the "Poor" category with times between 5'41 to 5'86 seconds, and 2 students (8%) belonged to the "Very Poor" category with slower times, namely between 5'86 to 6'30 seconds.

This data shows that the majority of students were in the "Good" to "Excellent" category (54%), which reflects that most students have good enough speed to support their performance in pencak silat matches. However, there are still students who are in the less to very less category (23%), which requires special attention in the training program, especially in improving acceleration and short sprint techniques.

Table 6. Distribution of Limb Muscle Explosiveness Levels of Pencak Silat Students at SMA N 1 Bergas

Classification	Frequency	Percentage	Category
>250 cm	3	12%	Perfect
241-250 cm	6	23%	Excellent
231-240 cm	10	38%	Good
221-230 cm	3	12%	Medium
211-220 cm	4	15%	Less
<211	0	0%	Very Poor

Measurement of leg muscle explosive power was carried out through the Standing Broad Jump test on 26 pencak silat students. Based on the classification results, it is known that as many as 3 students (12%) obtained results of more than 250 cm and fell into the "Perfect" category. Furthermore, 6 students (23%) recorded results between 241-250 cm which was categorized as "Excellent", and 10 students

HALAMAN OLAHRAGA NUSANTARA
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

(38%) were in the range of 231-240 cm, which was included in the "Good" category. A total of 3 students (12%) were in the "Moderate" category with a jump distance between 221-230 cm, and 4 students (15%) were classified as "Deficient" because they were only able to jump as far as 211- 220 cm. 220 cm. There were no students who obtained results below 211 cm, so the "Very Poor" category had a frequency of 0%.

These results show that most students (73%) have leg muscle explosive power abilities that are classified as good to perfect. This is a positive indicator of their physical readiness, especially in performing basic pencak silat techniques that require explosive strength such as kicks and jumps. However, there are still 27% of students with moderate to poor results, who need a more intensive and targeted training program to increase leg muscle strength.

Table 7. Distribution of Arm Muscle Explosiveness Level of Pencak Silat Students at SMA N 1 Bergas

Classification	Frequency	Percentage	Category
>6,23	7	27%	Excellent
5,38-6,22	10	38%	Good
4,53-5,37	6	23%	Fair
3,68-4,52	3	12%	Less
2,63-3,67	0	0%	Very Poor

The results of the measurement of arm muscle explosive power were obtained through the Two-Hand Medicine Ball Put test on 26 pencak silat students. Based on the classification of test results, a fairly diverse distribution of arm muscle explosive power abilities is obtained. A total of 7 students (27%) were classified in the "Excellent" category with a throwing distance of more than 6.23 meters. This shows that almost a third of the total sample has very good arm muscle strength in supporting explosive top attack techniques. Furthermore, 10 students (38%) were in the "Good" category, with throwing distances between 5.38-6.22 meters. This group is the largest proportion in the population, which reflects that the majority of students already have adequate arm muscle explosive capacity for match needs. A total of 6 students (23%) fell into the "Fair" category, with results between 4.53-5.37 meters, and 3 students (12%) fell into the "Good" category.

students (12%) fell into the "Deficient" category, with results between 3.68-

HALAMAN OLAHRAGA NUSANTARA
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

4.52 meters. Although no students were found in the "Deficient" category (less than 3.68 meters), the presence of students in the moderate to low categories still indicates the need for improvement in the aspect of arm muscle strength. Overall, 65% of students showed results in the "Good" to "Excellent" categories, indicating that most pencak silat students in Bergas already have fairly good arm muscle explosive strength. However, with 35% of students still in the "Fair" and "Deficient" categories, it is recommended that coaches pay special attention to upper muscle strength training in a more structured and intensive manner, in order to increase the explosive power and effectiveness of hitting techniques in matches.

Discussion

Speed of Pencak Silat Students in Extracurricular High School N 1 Bergas

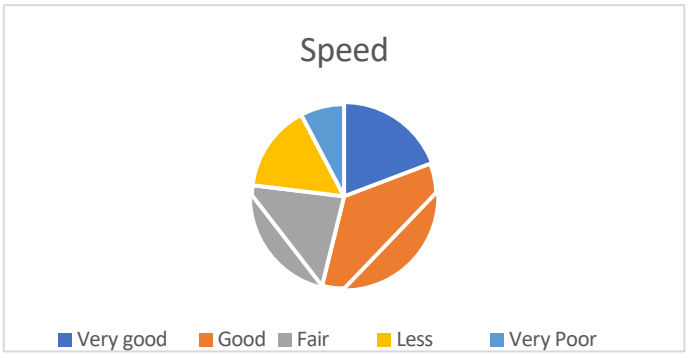

Figure 1. Distribution of Speed Levels of Pencak Silat Students in Extracurricular High School N 1 Bergas

The results showed that the speed ability of pencak silat students at SMA N 1 Bergas was quite diverse. Most students are in the good to excellent category (54%), while the rest are in the sufficient category (23%) and less to very less (23%). This indicates that although most students have a decent level of speed for competition needs, there is still a group of students who need special attention in this aspect.

Speed is one of the biomotor components that is very decisive in pencak silat. Students with high speed have a better ability to make quick attacks, avoid opponent attacks, and set the rhythm of the match. This is in line with the findings of Purwanto and Nugroho (2019) who stated that speed is the dominant factor in the success of fast attack and defense techniques in youth level pencak silat. This

HALAMAN OLAHRAGA NUSANTARA
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

research is also in line with the study by Ramadhani et al. (2021) which found that 30 meter sprint speed has a significant correlation with the effectiveness of direct attacks in pencak silat matches. In their research, students who were able to complete the sprint in under

4.50 seconds had a 30% higher success rate of attack techniques compared to students who had low speed. However, the presence of students in the "less" to "very less" category (23%) indicates a need for overall physical condition improvement. This can be caused by various factors, such as the frequency of training that is not optimal, the lack of variety in training programs, to non-physical aspects such as motivation and discipline in training. Sutrisno and Hidayat (2018) mentioned that speed development is not enough with regular running training, but must be supported by a training program that includes acceleration, reaction, and starting technique training.An effective speed training approach is also recommended by Bompa & Buzzichelli (2019) in the framework of periodization of student training. They emphasize the importance of integration between short sprint training, plyometric training, and technique training to improve the efficiency of students' movements, especially in martial arts sports such as pencak silat that require quick responses and explosive movements in a short period of time.

The speed of students in Bergas can be used as a reference for coaches and trainers in developing a more specific and targeted physical training program. The use of methods such as sprint interval training, reaction drills, and resistance sprinting is considered effective for gradually improving students' speed performance. The training program must be adjusted to the level of each
level of each student to avoid overtraining and injury. With data-driven training planning and periodic evaluation, speed improvements can be achieved evenly across all students, thus supporting better achievement in pencak silat competitions at regional and national levels.

HALAMAN OLAHRAGA NUSANTARA
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

Limb Muscle Explosiveness of Pencak Silat Students at SMA N 1 Bergas

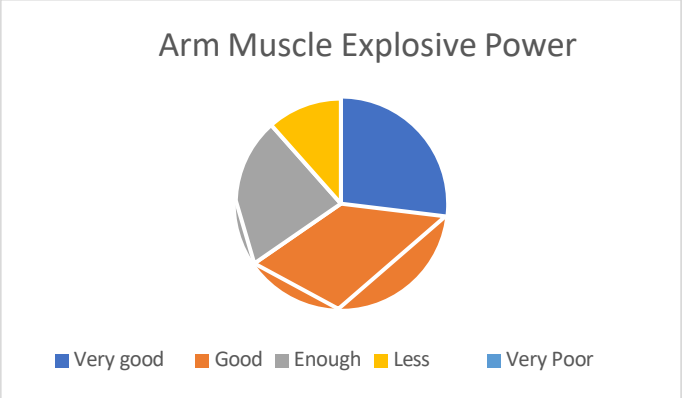

Figure 2. Distribution of Limb Muscle Explosiveness Levels of Pencak Silat Students in Extracurricular High School N 1 Bergas

Leg muscle explosiveness is one of the important biomotor components in pencak silat. This ability is needed to support explosive techniques such as kicks, jumps, and intense sudden movements in matches. In this study, leg muscle explosiveness was measured using the Standing Broad Jump test, and the results showed a wide variation in performance among students.

A total of 3 students (12%) were in the "Perfect" category, showing very high explosive ability with a jump distance of more than 250 cm. This category reflects a group of students with optimal physical potential that strongly supports high technical performance. Meanwhile, 6 students (23%) were in the "Excellent" category, and 10 students (38%) were in the "Good" category, with a jump range between 231-250 cm. Overall, 73% of students were in the good to excellent category, which is a positive indicator of the quality of leg muscle explosive power of the majority of students. This finding is in line with research conducted by Sardjono and Rahayu (2020), which states that leg muscle explosive power has a significant contribution to the effectiveness of kicking techniques in pencak silat. They concluded that students with jumping abilities of more than 240 cm tend to have more dominant kicking power and movement in matches.

However, there were 3 students (12%) in the "Moderate" category and 4 students (15%) in the "Deficient" category. This condition indicates that although the majority of students have good performance, there are still around 27% of

HALAMAN OLAHRAGA NUSANTARA
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

students who need special attention in the aspect of strengthening leg muscles. According to Harsono (2018), the explosive ability of the leg muscles is not only influenced by the strength of the muscles themselves, but also by technique, neuromuscular coordination, and consistently trained muscle elasticity. Bompa & Buzzichelli (2019) within the framework of periodization of student training suggest the use of plyometric exercises as an effective method of improving leg muscle explosiveness. These exercises include a series of jumping, squat jumping, and bounding movements that focus on rapid and repetitive explosive muscle contractions. This can increase motor unit activation and leg muscle contraction speed, which is very useful in sports such as pencak silat.

Conditions in the field also show that non-physical factors such as training frequency, implementation techniques, and program consistency also affect the results obtained. Students who are in the less category may not have received an intensive enough training stimulus or have not undergone a structured and periodic physical development program. Overall, these results indicate that coaches and trainers in the Bergas area can maintain and improve the performance of students who are already in the good category, while making special interventions for students who are still in the moderate and deficient categories. The implementation of dynamic strength training based on resistance training and plyometric and periodic monitoring of progress can be a strategic solution in lifting leg muscle explosive performance equally at all levels of students.

Arm Muscle Explosiveness of Pencak Silat Students at SMA N 1 Bergas

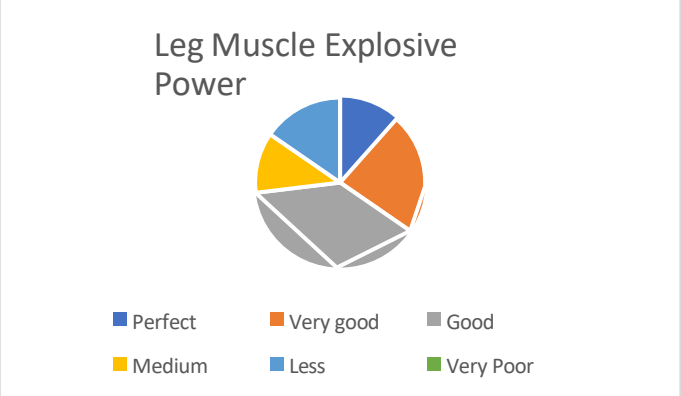

Figure 3. Distribution of Arm Muscle Explosive Power Level of Pencak Silat Students in Extracurricular High School N 1 Bergas

HALAMAN OLAHRAGA NUSANTARA
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

Arm muscle explosive power through the Two-Hand Medicine Ball Put test shows that most of the martial arts students in this study have fairly good arm explosive strength. A total of 65% of students were in the "Good" to "Excellent" category, which reflects the ability of the upper arm muscles to perform explosive movements, such as fast punches, thrust attacks, and strong parries, which characterize the techniques in pencak silat. A total of 7 students (27%) fell into the "Excellent" category, with a throw distance of more than 6.23 meters. This indicates that these students have efficient muscle activation, high neuromuscular coordination, and good adaptation to explosive strength training. However, there were still 9 students (35%) who were in the "Fair" to "Poor" category, indicating the need for improvement in the aspect of upper arm muscle strength.

This finding is in line with the results of research by Alikhani et al. (2021) which states that arm muscle explosive power is an important indicator in the success of martial arts matches, especially in sports that rely on fast punches and hand reactions. In their study of taekwondo and karate students, high medical ball throw scores correlated with better attack speed and more frequent match wins. often. From a physiological perspective, arm muscle explosiveness depends on the activation of type II (fast-twitch) muscle fibers and coordination ability between muscles (Behm & Sale, 2020). The absence of students in the "Very Poor" category is a positive indicator, but the presence of students in the "Poor" and "Fair" categories indicates that the special training program for explosive arm strength has not been implemented optimally.

The new and interesting thing that can be raised from this research is the possibility of the limited use of explosive power training in rotational and multi-directional motion patterns, even though the techniques in pencak silat are not only linear, but also rely on crossing and rotational movements. Therefore, training approaches such as medical ball rotational throws, one-handed push-ups, or weight-bearing punches in diagonal directions could be more effective and relevant for improving explosive power in the context of silat techniques (Raya-González et al., 2023). Thomas et al. (2022) suggested the application of contrast training -

HALAMAN OLAHRAGA NUSANTARA
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

combining heavy weight training (e.g. bench press) with light explosive exercises (e.g. medical ball chest pass) - which has been shown to be effective in developing arm muscle explosiveness in martial arts students. This method has great potential to be applied to pencak silat students, especially for those who are still in the moderate and poor performance categories. While most of the students performed reasonably well, these results provide an opportunity to improve performance through a more specific, individualized, and science-based training approach to optimize arm muscle explosive power and make it relevant in supporting pencak silat sparring performance.

CONCLUSION

Based on the results of the study, it can be concluded that the biomotor condition of pencak silat students at SMA N 1 Bergas is generally in the good to very good category, especially in the aspects of speed, leg muscle explosiveness, and arm muscle explosiveness. These findings reflect the physical readiness of the majority of students to compete at a competitive level, which is in line with the achievements of Bergas students in various regional championships. However there are still. There is still a proportion of students who are in the fair to poor category, so that more structured and focused physical training interventions are needed. The implementation of evidence-based training methods such as sprint interval training, plyometric, and contrast training is recommended to improve biomotor performance thoroughly and evenly. With a systematic and adaptive coaching approach, the potential of pencak silat extracurricular students at SMA N 1 Bergas can be optimized to support the sustainability of achievements at the provincial and national levels.

REFERENCES

Aditia, E. A., Anam, K., Anggita, G. M., Permana, D. F. W., Nurfadhila, R., Setiowati, A., Indardi, N., Susanto, N., Nurrachmad, L., & Irawan, F. A. (2022). Analisis Kondisi Fisik Atlet Softball Putri Kota Kudus Menuju PORPROV XVI. *Jorpres (Jurnal Olahraga Prestasi)*, *18*(2). https://doi.org/10.21831/jorpres.v18i2.49662

Aprisandy, D., Asnaldi, A., & Nirwandi. (2019). Pengaruh Weight Training Terhadap Peningkatan Daya Ledak Otot Lengan. *Journal Sains Olahraga Dan Pendidikan Jasmani*.

Ayu, D., & Setyaningrum, W. (2019). Cedera olahraga serta penyakit terkait

HALAMAN OLAHRAGA NUSANTARA
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

olahraga. *Jurnal Biomedika Dan Kesehatan*, *2*(1). https://doi.org/10.18051/JBiomedKes.2019

Fahrurozi, & Syahara, S. (2019). *Latihan Daya Ledak Otot Tungkai Berpengaruh Terhadap Efektifitas Tendangan Sabit*.

Fauzi, M., Wiriawan, O., & Khamidi, A. (2020a). *Multilateral: Jurnal Pendidikan Jasmani dan Olahraga*. *19*(2).

Fauzi, M., Wiriawan, O., & Khamidi, A. (2020b). *Pengaruh latihan hiit dan saq terhadap kelincahan dan kecepatan*.

Gede Adi Mandala Putra, D., Subekti, M., Ketut Sumerta, I., Gusti Putu Ngurah Adi Santika, I., Studi Pendidikan Jasmani, P., & dan Rekreasi, K. (2022). Efektivitas pelatihan double leg bound terhadap daya ledak otot tungkai. *Journal*

Keolahragaan, *1*. https://doi.org/10.5281/zenodo.6486763

Gustama, K., Firlando, R., & Syafutra, W. (2021). Hubungan Daya Ledak Otot Tungkai dengan Keterampilan Tendangan Lurus Atlet Pencak Silat.

Gelanggang Olahraga: Jurnal Pendidikan Jasmani Dan Olahraga (JPJO), *5*(1), 29–39. https://doi.org/10.31539/jpjo.v5i1.2860

Hanief, Y. N., & Purnomo, A. M. I. (2019). Menuju Pekan Olahraga Provinsi (PORPROV) Jawa Timur tahun 2019: Analisis kondisi fisik cabang olahraga petanque. *Prosiding Seminar Nasional IPTEK Olahraga (SENALOG)*, *2*(1),1–4. https://ejournal.unibabwi.ac.id/index.php/semnassenalog/article/view/57 5

Hasyyati[1], R. W., Winarno[2], M. E., & Korespondensi, P. (2021). *Jurnal Olahraga Pendidikan Indonesia (JOPI) ~ 96 Is licensed under a Creative Commons Attributions-Share Artike 4.0 International LIcense Jurnal Olahraga Pendidikan Indonesia (JOPI*. *1*(1), 96–107. http://jopi.kemenpora.go.id/index.php/jopiKorelasikekuatanototlengan

Majid, W. (2020). Perilaku Aktivitas Olahraga Terhadap Peningkatan Kebugaran Jasmani Pada Masyarakat. *Seminar & Conference Nasional Keolahragaan*, *1*, 74–80.

Muhammad, B. U. (n.d.). *Kemampuan Pukulan Depan Pada Mahasiswa Pencak Silat UNS*.

Mustakim, K., Studi, P., Kepelatihan, P., Fakultas, O., & Keolahragaan, I. (2019). Hubungan Panjang Tungkai Dan Berat Badan Terhadap Kecepatan Lari Sprint 60 Meter. In *Jurnal*

Ilmiah "Pendidikan Dasar (Issue 1).

Prasetyo, D. E., Damrah, D., & Marjohan, M. (2018). Evaluasi Kebijakan Pemerintah Daerah dalam Pembinaan Prestasi Olahraga. *Gelanggang Olahraga: Jurnal Pendidikan Jasmani Dan Olahraga (JPJO)*, *1*(2), 32–

41. https://doi.org/10.31539/jpjo.v1i2.132

Prima, P., Cahyo Kartiko, D. S., Jasmani, P., dan Rekreasi, K., & Ilmu Olahraga, F. (2020). *Survei Kondisi Fisik Atlet Pada Berbagai Cabang Olahraga*. https://ejournal.unesa.ac.id/index.php/jurnal-pendidikn- jasmani/issue/archive

Ridho Setiawan, M., Zulfikar Najat, F., Veryza Farhan, R., Suhendan, A., Jejak, R., Kunci, K., Fisik, K., & Silat, P. (2022). ANALISIS FAKTOR

HALAMAN OLAHRAGA NUSANTARA
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

Kondisi Fisik Atlet Pencak Silat Keterangan. In *Jurnal Olahraga dan Kesehatan Indonesia (JOKI)* (Vol. 3, Issue 1). https://jurnal.stokbinaguna.ac.id/index.php/jok

Rohmah, L., & Muhammad Nur, H. (2021). Tingkat Kebugaran Jasmani Dan Aktivitas Fisik Siswa Sekolah. *Universitas Negeri Surabaya*, *9*.

Samsu. (2021). *Metode Penelitian : Teori dan Aplikasi Penelitian Kualtitatif, Kuantitatif, Mixed Methods, serta Reseacrch & Development* (Rusmini, Ed.; 2nd ed.). Pusaka Jambi.

Sinulingga, A., Pasaribu, A. M. N., Bangun, S. Y., Ningrum, D. T. M., & Mahyudi, Y. V. (2023). Plyometric Exercise and Speed on the Power of Sabit Kick in Pencak Silat. *International Journal of Human Movement and Sports Sciences*, *11*(3), 591–597. https://doi.org/10.13189/saj.2023.110311

Sutopo, W. G., & Misno. (2020). *Analisis+Kecepatan+Tendangan+Sabit+Pada+Pesilat+Remaja+Perguruan +Pencak+Silat+Tri+Guna+Sakti+Di+Kabupaten+Kebumen+Tahun+2020*.

Sutoyo, M. (2020). In Pursuit of Sufistic Values Depicted in Indonesian Pencak Silat: The case of Setia Hati Terate Brotherhood (PSHT). *Talent Development&Excellence*, *12*(1), 1420–1429. http://search.ebscohost.com/login.aspx?direct=true&db=s3h&AN=144307248&lang=ja&site=ehost-live

Taqwim, R. I., Winarno, M. E., & Roesdiyanto, R. (2020). Pelaksanaan Pembelajaran Pendidikan Jasmani, Olahraga, dan Kesehatan. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, *5*(3), 395. https://doi.org/10.17977/jptpp.v5i3.13303