



Some forms of Motor Speed and its Relationship to the Technical Performance of the Blocking Skill in Volleyball for Students

Asghar Fadhil Weli

Directorate of Education of Nineveh, Iraq

*Corresponding Author: Asghar, Weli, e-mail: asghar.fadhil@alnoor.edu.iq

Received: xx Month 2023, Approved: xx Month 2023, Published: xx Month 2023

Abstract

Study purpose. This study aims to identify effect of relationship among some forms of motor speed and technical performance of blocking skill in volleyball for students.

Materials and methods. The researcher used the descriptive method and correlational relationships as it is tool that achieves objectives of study. The study community consists of students from Department of Physical Education and Sports Sciences for the academic year (2025-2026) second stage, with a total of 90 students. The study sample consisted of 80 students, also selected 10 students for the pilot study, who were chosen by the researcher using purposive method for purpose of applying study tests on them.

Results. The results showed that the highest score recorded for transitional speed was 9 and the lowest was 4, with a range of 5. Regarding the speed of changing direction, the highest score was 14 and the lowest was 9, with a range of 5. As for the acquisition of the technical performance of the blocking skill, the highest score was 6.42 and the lowest was 5.66, with a range of 2. The simple correlation coefficient between these variables was 0.805, with a significance level of 0.000 (less than 0.05) and 78 degrees of freedom; this indicates a statistically significant correlation between the variables in the context of learning volleyball.

Conclusions. Some forms of motor speed translational speed and change of direction speed play an important and essential role in mastering the technical performance of the blocking skill in volleyball for students.

Keywords: Motor speed, Technical performance, Block skill, Volleyball.

DOI: <https://doi.org/10.52188/ijpeess.v6i3.2344>

©2026 Authors by Universitas Nahdlatul Ulama Cirebon



Introduction

Movement speed plays a significant role in the proper execution of the volleyball blocking skill. Timing is the key to a player's success in defending the court to prevent the ball

from crossing into the team's area during the match, as quick movement enables the player to respond rapidly to the attacking ball and effectively block it. Therefore, one of the biggest challenges facing the player when performing the block skill is the lack of some forms of motor speed (Lygouras & Tsinakos, 2024).

Motor speed has several forms, including reaction speed, speed of direction change, and transitional speed, which is represented by the ability to run quickly and move towards the net to form a block in front of the attacking player (P. Piepiora & Witkowski, 2023). Another form is the speed of direction change during the execution of the motor skill to prevent the player from executing a powerful strike, resulting from the rapid change in direction by the blocking players and performing complex movements quickly, such as receiving and passing the ball. Motor speed "means the ability to move quickly and accurately in various directions and is defined as the ability to perform physical movements at high speed." (P. A. Piepiora et al., 2024) Transitional motor speed depends on what the player possesses in terms of the ability to move quickly forward and upward at maximum motor speed, such as sprinting and launching the body upward. The speed of direction change is crucial in executing the block skill in volleyball, as it indicates the ability to change the path of movement quickly while performing the motor task during skill execution. Therefore, the speed of performing complex movements is evident in the player's ability to execute several consecutive movements quickly, moving the arms and hands to face the ball to prevent the attacker from successfully passing the ball to the team's court and controlling it or changing its direction (Sujarwo et al., 2021).

The importance of the study is manifested in highlighting the role of the blocking skill in volleyball, as it represents the first line of defense for the team at the net against powerful attacks. A well-timed block and good positioning can return the ball to the opponent's court, which is referred to as a strong and timely block.

Learning the technical performance of basic skills in volleyball requires the player to possess general motor abilities (Wibowo & Wicaksono, 2024). The technical performance of the blocking skill in volleyball relies on mastering it through the availability of specific forms of motor speed (Mahedero et al., 2021). This motor ability has several basic forms, including response speed, change of direction speed, and transitional speed, which are essential elements for the successful performance of the skill. (Cruz, 2024) A player's weakness in performing it motorically will lead to an inability to respond, move, and transition to the net correctly. (Dupri et al., 2021) Therefore, blocking the ball is not limited to jumping towards the net but requires precise timing and a proper launch towards the net (Zainudin et al., 2024). This is because a player's inability to move quickly and change direction while executing the skill will result in a delay in reaching the net and forming the block to confront the attacker during their powerful strike (Wibowo et al., 2022). The researcher, through field experience in volleyball, found that there is a weakness among most coaches of youth teams, who do not include in their educational curriculum implemented in teaching units the development of some forms of motor speed, which is directly related to the success of the player in forming the block and preventing the attacker from executing the strike successfully against the team. (Adiputra & Simamora, 2024) This can be achieved by demonstrating its important role in quick movement in the front area towards the net during the preparatory and main parts of the blocking skill (Klocek, 2023). Therefore, this study came to shed light on one of the important motor abilities in the field of motor learning in volleyball, specifically the blocking skill.

Research objectives to identify the effect of the relationship between some forms of kinetic speed and the technical performance of the blocking skill in volleyball for students.

Research hypothesis there is a statistically significant correlation between some forms of kinetic speed and the technical performance of the blocking skill in volleyball for students.

Terms definition: Forms of kinetic speed: They are classified into several forms, including transition speed and the speed of executing complex movements, and these forms depend on muscular strength and neuromuscular coordination.

Technical performance: It is the method of executing the skill and consists of three main sections: the preparatory section, which includes the readiness stance with the knees slightly bent, the arms raised in front of the chest while looking forward; the main section, in which the player moves to jump upwards with the arms raised high; and the concluding section, which represents the landing phase on the feet away from the net. The skill of the block wall: It is one of the basic and offensive skills, as it represents the first line of defense in volleyball, and it relies on high jumping near the net (Wibowo et al., 2022).

Materials and methods

Study participants

The research population consisted of 90 second-year students from the Department of Physical Education and Sports Sciences at the Open Educational College for the 2025–2026 academic year. The study sample comprised 80 students. Additionally, a group of 10 students was selected—using purposive sampling—to participate in the study's pilot experiment for the purpose of administering the research test. Means, tools, and devices: Data collection forms: Surveys to gather the opinions of the referees in order to determine some forms of specific movement speed related to the defensive wall skill in volleyball. Surveys to gather the opinions of the referees in order to determine the specific physical and skill tests under study. Recording the results of the physical and skill tests for the trainees under study - recording the data for each player. Tools and devices used: Tape to mark the lines of the court. Markers. Flying balls (1).0 Referee whistle (3) Measurement tape. Stopwatch. Forms for recording the results of the motor and skill tests. Scientific calculator. Selection of the assistant team: The researcher enlisted a group of assistants who possess academic qualifications in the field of volleyball for youth, numbering (3) to assist in implementing the practical tests related to the study.

Study organization

The tests under investigation were selected, which are standardized tests recommended by the esteemed experts for application in the study.

Test of change of direction speed for volleyball players (20-meter sprint test) (Oliinyk, I., Doroshenko . 2021). The purpose of the test: To measure the ability to reach maximum speed and change direction quickly, which is essential in the movement of the subject between locations, measuring the ability to accelerate and reach maximum speed over a short distance.

Method of performance: The subject stands at the starting line of the court and starts running after hearing the starting whistle around the four markers located on the straight line in the middle of the court over a distance of (20 meters).

Tools: Electronic stopwatch, measuring tape, conical markers, and a flat area free of obstacles over a distance of (20 meters). Recording: The time taken by the subject is recorded using an electronic stopwatch from the start line to the end of the 20-meter distance designated for the test.

Transitional speed test (Kabacinski et al., 2022) Tools: start and stop timing or stopwatch, flat area free of obstacles, conical shape markers. Test Planning: Markers are placed at a distance

of (5 and 15) meters from a specified line on the ground as shown in the diagram. Test Procedure: The tester runs from the (15) meter mark towards the finish line (the specified distance to increase speed) and passes the (5) meter marks, then turns at the finish line and runs back through the (5) meter marks. The time is recorded from the moment the athlete first runs past the (5) meter mark and stops upon returning through these marks (i.e., the time taken to cover the distance of (5) meters up and down - a total of 10 meters). Recording: The best time is recorded for the experiment.

Pilot study: The researcher's goal in conducting his exploratory experiment is to assess the method of conducting his tests and the extent to which they comply with scientific standards, while ensuring the resolution of obstacles that may face the assisting team and finding alternatives to guarantee accurate results for the data of the testers in the main work experiment.

Scientific transactions for tests: The researcher emphasized the necessity of establishing scientific transactions for the tests (validity, reliability, and objectivity) in the technical performance test of the blocking skill in volleyball and the specific motor tests for some forms of motor speed, as follows:

Validity: The researcher resorted to using content validity for the field tests, which were presented to experts and specialists in (volleyball, testing, measurement, and motor learning), and everyone agreed that these tests are valid and measure the attribute intended to be measured.

Reliability: The researcher obtained the reliability coefficient for the tests through retesting (the technical performance test of the blocking skill in volleyball and the specific motor tests for some forms of motor speed), as the test was applied to an exploratory sample consisting of (2) students on Sunday.04/02/2026 and the retest was conducted after one week on the date of 11/02/2026, and using the correlation formula (Spearman), the reliability coefficient was extracted, as shown in the [Table 1](#).

Objectivity: The objectivity coefficient for the tests under investigation was obtained through the evaluation of two qualified and experienced judges.

Table 1. Scientific coefficients for the tests of the block performance accuracy in volleyball and some forms of kinetic speed

Scientific coefficients	Stability coefficient	Objectivity coefficient
Transitional speed	0.94	0.93
Technical performance of blocking skill	0.93	0.92
Speed in changing direction	0.92	0.91

Field Research Procedures: The main experiment: The research procedures involved the researcher starting to conduct pre-tests (the technical performance test of the blocking skill in volleyball and tests of some forms of motor speed) on the research sample consisting of (10) students on Tuesday16/02/2026at ten o'clock in the morning in the closed sports hall in Maysan Governorate with the help of the team.

Statistical analysis

The results of the tests were tabulated, and then the researcher processed them statistically using the statistical program (SPSS) version (29).

Results and Discussion

Presentation of Descriptive Data Results for Research Variables:

Table 2. Results of descriptive data for variables

Tests	Median	Mean	Standard deviation	Standard error	Coefficient of skewness	Maximum	Minimum Degree	Range
Transitional speed	6.229	6.000	0.732	0.704	0.309	9	4	5
Technical performance of blocking skill	11.505	11.000	1.908	0.920	0.521	14	9	5
Rate of change of direction	6.18	5.94	1.490	0.480	0.884	6.42	5.66	2

It is noted from [Table 2](#) that the mean of the transitional speed is (6.229), the median is (6.000), the standard deviation is (0.732), the standard error is (0.704), and the coefficient of skewness is (0.309). The highest score was (9) and the lowest score was (4), with a range of (5). As for the arithmetic mean of the directional speed, it reached (11.505) and the median is (11.000) The standard deviation (2.920), the standard error (0.794), and the skewness coefficient (0.521) were recorded, with the highest score being (14) and the lowest score (9), resulting in a range of (5).As for the arithmetic mean, the technical performance of the skill of the block wall reached (6.18), the median (5.94), and the standard deviation (1.490) and the standard error (0.480) and the torsion coefficient (0.884) The highest score was (6.42) and the lowest score was (5.66), with a range of (2).

Presentation of the results of the correlation between the transitional speed test and the technical performance of the blocking skill in volleyball

Table 3. Results of the means, standard deviations, the calculated correlation value, and the level of significance between the transitional speed test and the technical performance of the blocking skill.

Tests	Measurement unit	Mean	Standard deviation	Correlation value	Sig. level	Sig. type
Transitional speed	Second	6.229	0.225	0.805	0.000	Sig.
Technical performance of blocking skill	Degree	6.18	1.490			

Degrees of freedom (n-2) = 78, significance level (0.05)

It is noted from [Table 3](#) that the mean for the (transitional speed) test was (6.229) and the standard deviation was (2.225). Meanwhile, the mean for the (technical performance of the block skill) was (6.18) and the standard deviation was (1.490) for the sample applied. The value of the simple correlation coefficient (Pearson) between them was (0.805) at a significance level of (0.000), which is less than (0.05) with degrees of freedom (78), indicating a significant

correlation between the transitional speed test and the technical performance of the block skill in volleyball.

Presentation of the results of the correlation between the directional change speed test and the technical performance of the block skill in volleyball:

Table 4. Results of the arithmetic means, standard deviations, the calculated correlation value, and the level of significance between the agility change speed test and the skill performance of the block skill

Tests	Measurement unit	Mean	Standard deviation	Correlation value	Sig. level	Sig. type
Rate of change of direction	Second	11.505	1.908	0.824	0.000	Sig.
Technical performance of blocking skill	Degree	6.18	1.490			

Degrees of freedom (n-2) = 78, significance level (0.05)

It is noted from [Table 4](#) that the arithmetic mean for the (agility change speed) test was (11.505) and the standard deviation was (1.908), while the arithmetic mean for the (technical performance of the block skill) was (6.18) and the standard deviation was (1.490) for the sample applied. The value of the simple correlation coefficient (Pearson) between them was (0.824) at a significance level of (0.000), which is less than (0.05) with a degree of freedom of (78), indicating a significant correlation between the agility change speed test and the technical performance of the block skill in volleyball.

Discussion of the results of tests related to some forms of kinetic speed and the technical performance of the blocking skill in volleyball

The study results reveal a significant correlation between certain forms of movement speed and the technical execution of the volleyball blocking skill among students. The researcher aimed to determine the extent to which specific types of movement speed influence the technical execution of the skill during a match—specifically regarding the ability to move correctly and without error—and to assess whether the movement required to execute the skill contributes positively to optimizing time and effort across the various phases of the technical performance. Therefore, it is essential to clarify the role played by both translational speed and speed of direction change in the technical stages of the student's skill performance. Thus, the importance of possessing some forms of speed is evident through the speed of movement when performing the movement task towards the net, which occurs first in the preparatory phase when starting the movement, and then comes the main aspect in the main section of the skill, and the elevation when a change in the movement path is needed to control the ball and limit the danger of the attacker when executing the spike ([Wulandari et al., 2021](#)). "The forms of kinetic speed refer to the learner's ability to perform physical movements at high speed, which is represented by translational speed or speed of direction change and speed of executing complex movements.

Factors that affect the possession of kinetic speed while performing the movement are primarily represented by muscular ability, which means the level of fibers from a physical perspective for the student that helps them exert significant effort to achieve maximum speed,

and secondly, the ability of neuromuscular coordination for the student and the extent of the relationship and coordination between the working muscles to perform movements efficiently and accurately, and thirdly, flexibility through what they possess of kinetic flexibility of the muscles and joints and their ability to move within a wide range during execution, which leads to the student's ability to move and elevate quickly and skillfully while performing movements (Ben Said et al., 2024). Integrated performance means that the student possesses the motor skill that contributes to merging the qualities of strength and speed, which leads to executing the blocking skill in volleyball with high efficiency (Mohammed Jihad & Abdulelah Kareem, 2023). It is known that "translational speed is the ability to move from one place to another at the maximum possible speed within the shortest possible time, and it is often used in sports activities that require repeated movements to cover a certain distance (Jabbar et al., 2025).

Translational speed is closely related to the maximum use of muscular strength (Qutaiba Younus & Rashid, 2024). The way the student performs the blocking skill is not limited to jumping towards the net but also requires executing the correct technical movement and precise timing, along with a sharp mind to read the movement of the attacker in volleyball, whether you are a beginner or a professional. Therefore, the readiness position and footsteps should be your stance and foot movement, which are the most important part in the direction of the net and moving quickly towards the attacker to block the attacking hit. (Balcioglu 1a & Biçer, 2022) Thus, blocking the ball is not limited to just jumping towards the net; these movements require taking the appropriate blocking position quickly, but also necessitate good positioning and the correct technique for effective blocking, along with precise timing of the movement path of the attacking hitter to stop or slow down the ball or limit its danger to the team's court in defense. This movement primarily depends on what the student possesses of kinetic speed that contributes to the execution of the movement task by the participants in the blocking wall. "The importance of the blocking wall is evident as it serves as the first line of defense against the attacking spikes of the opposing team, giving the players in the backline time to prepare and control the powerful balls in volleyball (Shareef, 2025).

Importance of the speed of changing direction when the student performs the skill lies in quickly altering the body's movement path and maintaining balance while facing the movement of the attacking body during the execution of the spike. The student's ability to move quickly and change the body's movement path is a crucial element in the technical performance of the skill sections. Therefore, effectively executing the block contributes to reducing the chances of the opposing team's attack succeeding in scoring points in the match, which helps limit the offensive momentum and its impact on the game, giving your team an advantage. The student's ability to move at the net will significantly affect your performance in effectively blocking attacking balls. Thus, many volleyball coaches emphasize teaching their players to quickly use the appropriate blocking position, regardless of the direction of the hitter's attack. Therefore, focusing on improving players' blocking skills, such as the "shuffle step" or "cross step," to move quickly to the sides of the net is essential (Oliinyk et al., 2021).

In conclusion, learning the technical performance of the blocking skill in volleyball requires some forms of movement speed because they help players perform the correct movement for the skill. This is because transitional speed and the speed of changing direction are among the motor abilities that this skill relies on. Not possessing these abilities will lead to a weak technical performance from the student when executing the skill correctly.

Conclusions

The study results indicate a statistically significant positive relationship between certain forms of movement speed specifically, locomotor speed and the speed of changing direction and students' acquisition of the volleyball blocking skill. Movement speed plays a crucial, fundamental role, particularly regarding the speed of foot and arm movements during directional changes, as well as during the jumping and landing phases of the skill's execution. Ultimately, a student's success in the technical execution of the skill relies heavily on movement speed in mastering that technique. It is essential for teachers to use kinetic exercises (translational speed and change of direction speed) as they contribute to the learning process of the technical performance of the skill in volleyball during physical education lessons. Emphasizing the necessity for students to apply exercises involving some forms of kinetic speed in the introductory section of the lesson, as they play a particularly effective role in helping the student master the technical performance of the blocking skill in volleyball. Conducting research and studies related to the relationship between basic defensive and offensive skills in volleyball.

Acknowledgment

The authors thank the staff at Ministry of Education - Open Educational College for providing access to the analytical equipment.

Conflict of interest

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- Adiputra, A. M., & Simamora, H. H. (2024). Application of a Scientific Approach To Improve Learning Outcomes in the Mini Volleyball Game (Classroom Action Research on Grade VI Students of SD Negeri 72 Lubuklingau Academic Year 2022/2023). *Indonesian Journal of Sport, Health and Physical Education Science*, 2(1), 35–41. <https://doi.org/10.58723/inasport.v2i1.153>
- Balcioğlu 1a, A., & Biçer, B. (2022). *The effect of Futsal Training on the Speed, Agility, and Anaerobic Power of Male Children Aged 12-14 Years Old*. <https://doi.org/10.15314/tsed.1118476>
- Ben Said, N. M., Inoubli, L., Ben Said, Y. N., Koryagina, Y. V., Ammar, M. M., Akimkina, O. N., & Inoubli, M. (2024). Effect of Different doses of Creatine Supplementation on Power and Speed During the Preparation Period in Football Players. *Human Sport Medicine*, 24(2), 100–110. <https://doi.org/10.14529/hsm240213>
- Cruz, R. (2024). Enhancing Mini Volleyball Forearm Passing Performance with Small-Sided Games and Drill Practice. *British Journal of Multidisciplinary and Advanced Studies: Education, Learning, Training & Development*, 5(1), 148–160.
- Dupri, D., Candra, O., & Nazirun, N. (2021). The Implementation of Mini Volleyball in Physical Education to Increase Students' Creative Thinking Ability. *International Journal of Human Movement and Sports Sciences*, 9(4A), 89–93. https://www.hrpub.org/journals/article_info.php?aid=11091
- Jabbar, A. K., Faraj, A. S., & Khazaal Jabbar, A. (2025). Effect of phosphorous training according to pulse intensity to develop speed endurance and Achievement of 400-meter run for women Introduction Scientific creativity made researchers in the search and

- investigation of scientific facts. *Musamus Journal of Physical Education and Sport (MJPES)Physical*, 7(1), 308–316. <https://doi.org/10.35724/mjpes.v7i1.6743>
- Kabacinski, J., Szozda, P. M., Mackala, K., Murawa, M., Rzepnicka, A., Szewczyk, P., & Dworak, L. B. (2022). Relationship between isokinetic knee strength and speed, agility, and explosive power in elite soccer players. *International Journal of Environmental Research and Public Health*, 19(2), 671. <https://pubmed.ncbi.nlm.nih.gov/35055489/>
- Klocek, O. (2023). *Psychomotor determinants of children's sports talent for team sports: a case study of mini-volleyball athletes*.
- Lygouras, D., & Tsinakos, A. (2024). The use of immersive technologies in karate training: A scoping review. *Multimodal Technologies and Interaction*, 8(4), 27. <https://doi.org/10.3390/mti8040027>
- Mahedero, M. P., Calderón, A., Hastie, P., & Arias-Estero, J. L. (2021). Grouping students by skill level in mini-volleyball: Effect on game performance and knowledge in sport education. *Perceptual and Motor Skills*, 128(4), 1851–1871. <https://doi.org/10.1177/00315125211021812>
- Mohammed Jihad, H., & Abdulelah Kareem, Q. (2023). *International Journal of Health Systems and Medical Sciences The Effect of Specific Areas Exercises to Develop Scoring Speed Performance of Young Football Players*. <https://inter-publishing.com/index.php/IJHSM>
- Oliinyk, I., Doroshenko, E., Melnyk, M., Tyshchenko, V., & Shamardin, V. (2021). Modern approaches to analysis of technical and tactical actions of skilled volleyball players. *Teoriã Ta Metodika Fizičnogo Vihovannã*, 21(3), 235–243. <https://doi.org/10.17309/tmfv.2021.3.07>
- Piepiora, P. A., Čaplová, P., & Cynarski, W. J. (2024). A thing about karate in physical culture. *Frontiers in Sports and Active Living*, 6, 1430186.
- Piepiora, P., & Witkowski, K. (2023). Quo vadis, karate. *Arch Budo*, 19, 129–135.
- Qutaiba Younus, A., & Rashid, N. F. (2024). The Effect of Using Different Geometric Shapes and Different Colors on the Development of Basic Football Skills. *Indonesian Journal of Physical Education and Sport Science IJPES Indonesian Journal of Physical Education and Sport Science*, 4(3), 303–310. <https://doi.org/10.52188/ijpess.v3i1>
- Shareef, Q. B. (2025). Effect of Similar to Playing Situations Exercises to Develop Some Motor Abilities and Basic Skills in Junior Football Players. *Musamus Journal of Physical Education and Sport (MJPES)Physical*, 7(1), 274–280. <https://doi.org/10.35724/mjpes.v7i1.6738>
- Sujarwo, S., Suharyana, S., Rachman, H. A., & Al Ardha, M. A. (2021). The development of physical education learning models for mini-volleyball to habituate character values among elementary school students. *Sport Mont*, 19(2), 29–33. <http://www.sportmont.ucg.ac.me/?sekcija=abstract&artid=1825>
- Wibowo, Y. A., Sugiyanto, S., Kristiyanto, A., & Riyadi, S. (2022). Elementary Physical Education Teachers' Profile and Perception of The Mini Volley Ball Learning Model. *Conference on Interdisciplinary Approach in Sports in Conjunction with the 4th Yogyakarta International Seminar on Health, Physical Education, and Sport Science (COIS-YISHPESS 2021)*, 44–48. <https://www.atlantis-press.com/proceedings/cois-yishpess-21/125969174>
- Wibowo, Y. A., & Wicaksono, D. (2024). Mini volleyball learning model based on teaching game for understanding to improve engineering knowledge and skills in upper grade elementary school male students. *Fizjoterapia Polska*, (5). <https://doi.org/10.56984/8ZG020C2RJ9>

- Wulandari, I., Arnando, M., Jatra, R., & Resky, A. I. (2021). The Effect Arm Muscle Explosive Power and Self Confidence to Speed of Service. *Jurnal MensSana*, 6(2), 109–117. <http://menssana.ppj.unp.ac.id/index.php/jm/article/view/178>
- Zainudin, M., Destriani, D., & Syafaruddin, S. (2024). Mini volleyball games using plastic balls improve passing learning outcomes for grade IV elementary school. *Multilateral: Jurnal Pendidikan Jasmani Dan Olahraga*, 23(3), 175–185. <https://ppjp.ulm.ac.id/journal/index.php/multilateralpjk/article/view/19195/10368>

Information about the author:

Asghar Fadhil Weli., asghar.fadhil@alnoor.edu.iq, Directorate of Education of Nineveh, Iraq

Cite this article as:

Weli, A. F. (2026). Some forms of motor speed and its relationship to the technical performance of the blocking skill in volleyball for students. *Indonesian Journal of Physical Education and Sport Science (IJPESS)*, 6(3), 645-654. <https://doi.org/10.52188/ijpess.v6i3.2344>