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Contribution of Arm Muscle Strength, Eye Coordination and Level of Consertation to Volleyball Down Passing as Moderating Variables

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Abstract

The objectives of this research are as follows 1) To find out how much arm muscle strength (X1) contributes to the concentration level (Y) of students at SDN 171 Palembang; 2) To find out how much contribution Hand Eye Coordination (X2) has to the level of concentration (Y) of students at SDN 171 Palembang; 3)To find out how much the level of concentration (Y) contributes to the bottom passing of volleyball (Z) of students at SDN 171 Palembang; 4) To find out how much arm muscle strength (X1) contributes to the bottom passing of volleyball (Z) of students at SDN 171 Palembang; 5) To find out how much hand eye coordination (X2) contributes to the bottom passing of volleyball (Z) of students at SDN 171 Palembang; 6) To find out how much arm muscle strength (X1) contributes to Hand Eye Coordination (X2) of students at SDN 171 Palembang. This type of research method is quantitative research with a partial correlation approach. Quantitative methods are methods that are based on numerical information or quantities, and are usually associated with statistical analyzes. The results of the research can be concluded that there is a contribution of arm muscle strength, hand eye coordination and level of concentration to passing volleyball at SD Negeri 171 Palembang. Research suggestions for schools, teachers and parents are expected to establish good cooperation to create an atmosphere so that students can concentrate on doing anything, especially to improve students' academic and non-academic achievements in the field of sports.

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INTRODUCTION

Essentially, physical education is an integral component of the overall education system, with the aim of developing aspects of health, physical fitness, critical thinking skills, emotional stability, and other elements. More specifically, physical education is closely related to human interaction and the educational environment (Taufan et al, 2018). Therefore, Physical Education, Sports and Health (PJOK) is a subject that must be taught starting from elementary school level (Mashud, 2015), where physical education is taught from elementary school age with the aim of enabling educators to practice various psychomotor movements, techniques and strategies, as well as modifying sports games (Ismoko and Sukoco 2013).

In elementary school (SD) children, in general, students tend to always be active and moving. When playing, they naturally express joy and activeness through physical activity (Mustafa & Sugiharto, 2020). Therefore, through Physical Education, at the elementary school (SD) level, it can help develop various forms of expression that are closely related to pleasant personal experiences for them (Mustafa, 2021). As part of education, physical education cannot be separated from overall educational goals. Specifically, it can be said that physical education is an effort to achieve educational goals through physical activity (Soedjatmiko, 2015). This physical activity can take the form of games which can take the form of competitions and training, all of which are oriented towards educating students to become complete humans (Pratiwi et al, 2020).

One of the games that can involve students' physical activity that is taught in an elementary school (SD) environment is volleyball. Volleyball is a sport played by two teams with 6 players in each team (Adnan & Arlidas 2019). In the game of volleyball, there are several basic techniques, including: serving, passing down and over, smashing, and blocking. In particular, the passing technique is one of the basic volleyball techniques that must be mastered by every player, because this technique aims to direct the ball to a place or teammate to be played again (Jahrir, 2019).

Sovensi (2018) also states that there are several basic techniques that must be mastered in playing volleyball, one of the basic techniques in volleyball is passing. According to Samsudin Mushofi (2017), there are two types of passing in volleyball, namely lower passing and upper passing. Bottom passing is generally a pass from above that does not involve the fingers and the ball touches the top of the wrist which is used specifically as a first attacking pass (Afdi et al, 2019). Underpassing is one of the basic volleyball techniques that must be mastered, because this technique is the beginning of the formation of an attack or the basis for executing an attack/smash. Apart from that, passing down also plays a role in the rhythm of the game (Atsani, 2020).

In order for the lower passing movement to be carried out optimally, good physical condition is required. Without adequate physical conditions, the lower passing movement technique will not be able to be carried out perfectly. Components of physical condition include cardiovascular endurance, 2 muscle endurance, muscle strength, flexibility, speed, stamina, agility, eye-hand coordination, and power (Sahabuddin, 2019). Several physical components that

can influence downward passing include leg muscle strength, arm muscle strength, and hand eye coordination. Arm muscle strength is needed to support the bottom passing movement because the bottom passing movement is dominated by arm muscle movements. Arm muscle strength is the ability of the muscles to generate tension in resistance and lift weights. Most sports performances involve movements caused by the force created by muscle contractions (Saptiani et al, 2019). Arm muscle strength itself is an activity related to maximum arm strength in a short time. Arm muscle strength helps regulate volleyball playing technique because arm muscle strength is the driving force behind the forward movement of the arm and makes the score stronger against the ball. Thus, good arm muscle strength will produce good passing Apart from arm muscle strength, hand eye coordination is also needed to carry out good lower passing movements. Eye-hand coordination is a movement that occurs as a result of information being integrated into various movements in the body (Darmawan et al, 2020). Hand movements can be controlled visually according to the sequence of planned movements in volleyball underpasses (Ikadarny & Karim, 2020).

Hand-eye coordination is important in overall physical development. Throwing, hitting, pushing and pulling skills require hand-eye coordination. Hand eye coordination combines the ability to see and the ability to hand. Eye and hand coordination will result in timing and accuracy. Timming is oriented to timeliness, accuracy is oriented to target accuracy. Through good timing, the contact between the hand and the object will be as desired, resulting in effective movements. Accuracy will determine whether or not the object reaches the intended target. In the game of volleyball in passing, apart from arm muscle strength, hand eye coordination also requires a high level of concentration. Concentration plays a very important role in sports because if it is disturbed, problems will arise. Especially in sports that require accuracy towards the desired target, punching, pushing, kicking and shooting at the target. With concentration, these activities will run smoothly and according to wishes. Apart from being needed in sports activities, concentration is also very influential in life, especially for students when participating in teaching and learning activities at school. If students have a low level of concentration in teaching and learning activities, it is certain that achievement will decrease. Therefore, a person's level of concentration is very influential in doing something, both in academic achievement and non-academic achievement. In education, achievement is always desired by every student, one of which is success in passing under volleyball which does not only rely on arm muscle strength, correct eye-hand coordination to produce correct passes and on target, the role of concentration possessed by students is very necessary and needs to be known by coaches so that their students play optimally and well to produce brilliant achievements for individuals, teams and schools in volleyball games.

This research was carried out at SDN 171 Palembang. Based on the results of observations at SDN 171 Palembang from 10 July 2024 to 20 July 2024, based on the results of observations made by researchers, it can be stated that the low passing ability of students at SDN 171 Palembang is due to the low contribution of arm muscle strength, eye hand coordination and poor concentration levels. Weak arm muscle strength is shown when smashing and serving. When smashing and serving, the ball looks weak and is easy for the opponent to receive. Even when serving, the ball often gets

caught in the net and does not reach the opponent's court because it is too weak. When passing down the arm swing is still weak and the ball is less accurate in aiming at the tosser. Inaccuracy of the ball is due to lack of hand eye coordination and lack of concentration.

An indicator that states that the majority of students at SDN 171 Palembang still have difficulty making downward passes where the position of both students' arms is still too high. In addition, when the student receives the ball, the student's knees are not bent and the arms are not together, the ball hits the upper arm. This results in inaccurate passing of the ball.

The results of the initial observations carried out by the researchers above can provide a general description of the condition of arm muscle strength, hand eye coordination and concentration on passing volleyball. Therefore, based on this explanation, the research will conduct more in-depth research with the title "Contribution of Arm Muscle Strength, Hand Eye Coordination and Concentration Level to Volleyball Bottom Passing for Students at SD Negeri 171 Palembang".

METHODS

This type of research method is quantitative research with a partial correlation approach. Quantitative methods are methods that are based on numerical information or quantities, and are usually associated with statistical analyzes (Stoker, 2006). Then partial correlation analysis is used to test hypotheses if the researcher intends to find out the contribution or relationship between the independent and dependent variables, where one of the independent variables is controlled (made constant) (Sugiyono, 2017). The method used in this research is a survey method, namely an investigation conducted to obtain facts from existing symptoms and look for factual deficiencies (Arikunto, 2016). This method is to determine whether there is a relationship between two or several research variables by using an approach where the data is numerical and processed using statistical methods.

Participants

The population is a generalized area consisting of objects/subjects that have certain quantities and characteristics determined by the researcher to be studied and then conclusions drawn (Siyoto & Sodik (2015). Based on the opinion above, the population in the research are students who take part in volleyball extracurriculars consisting of grade 5 and grade 6 students at SDN 171 Palembang, totaling 43 students.

Sampling Procedures

Samples were taken using a purposive sampling technique. According to Sugiyono (2019), the sample was determined using certain considerations, namely 10 male students and 10 female students. In this case, the researchers took it based on age ≥12 years, the child's ideal height was 130cm-160cm, the student was in good health, had no illnesses, and had a physical body that supported the research.

Design or Data Analysis

Path Analysis Test, Path analysis is a development of multiple regression which involves more than two variables and has a complex relationship with each other. The purpose of the path analysis is to determine the structural relationship of various independent variables and dependent variables as well as the magnitude of their influence, both direct and indirect, as well as the total influence of the model built in the research (Trianto, 2015). According to Ghozali (2013), to test the influence of intervening variables, the path analysis method (Path Analysis)

is used. Path analysis is an extension of multiple linear regression analysis, or path analysis is the use of regression analysis to estimate causal relationships between variables (causal models) that have been previously established. Path analysis itself cannot determine cause-and-effect relationships and also cannot be used as a substitute for researchers to see causal relationships between variables. In path model analysis, a path model must first be created to test whether there is a mediating role or not. The path model is a diagram that connects independent, intermediate and dependent variables. In path analysis, the relationship pattern is shown using arrows, where a single arrow shows the causal relationship between exogenous and endogenous variables. To measure whether there is a mediating or intervening influence, a comparison of path coefficients is used. The path coefficient is a standard regression coefficient that shows the direct influence of an independent variable and a dependent variable in a model. The path coefficient is calculated by creating two structural equations, namely the regression equation which shows the hypothesized relationship (Ghozali 2013).

RESULT

This research aims to determine the "Contribution of Arm Muscle Strength, Hand Eye Coordination and Concentration Level to Volleyball Bottom Passing for Students at SD Negeri 171 Palembang". In detail, the description of the research data can be described as follows: Descriptive statistics are statistics used to analyze data by describing or illustrating the data that has been collected as it is without the intention of making generally accepted conclusions or generalizations. (Sugiono 2022). Descriptive statistical measurements of this variable are carried out to see a general picture of the data such as the average value (mean), highest value (max), lowest value (min), and standard deviation value for each variable which can be seen in the attached Descriptive Statistics Results Table from SPSS calculations.

The SPSS output results above, we can see the distribution of data obtained by the researcher, namely variable (X1) Arm muscle strength. From this data it can be described that the mean value is 30.45, standard deviation is 2,819, the median value is 30.50, the minimum value is 25, while the maximum value is 35. From the SPSS output results above, we can see the distribution of data obtained by the researcher, namely the variable (X2) Hand Eye Coordination. From this data it can be described as the mean value of 30.10, standard deviation of 3,210, median value of 30.00, minimum value of 24, while the maximum value is 36. From the SPSS output results above, we can see the distribution of the data obtained by the researcher, namely the variable (Y). The concentration of the data can be described as the mean value is 23.25, standard deviation is 1,970, the median value is 23.00, the minimum value is 20, while the maximum value is 27. From the SPSS output results above, we can see the distribution of data obtained by the researcher, namely the variable (Z) Passing Baawah. From this data it can be described as the mean value of 27.40, standard deviation of 2,186, median value of 27.50, minimum value of 23, while the maximum value is 31.

Tabel 1. SPSS Output Results and Interpretation of Model 1 Path Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	21.496	7.071		3.040	.008
	Kekuatan otot lengan	.484	.172	.624	2.813	.003
	Koordinasi mata tangan	.380	.151	.558	2.511	.003
	Konsentrasi	.112	.219	.101	2.515	.004

a. Dependent Variable: Passing bawah

Hypothesis 1

Based on the significance value of the arm muscle strength variable (X1) of 0.003 <0.05, it can be concluded that the arm muscle strength variable (X1) has a significant effect on the lower passing variable in volleyball (Z). And if t count > t table, then Ho is rejected. From the SPSS output results above, it can be seen that the calculated t value > t table is 2.813 > 1.6972, so Ho is rejected so that for hypothesis 1 it can be concluded that there is a contribution of arm muscle strength (X1) to the bottom passing of volleyball (Z) of students at SDN 171 Palembang.

Hypothesis 2

Based on the significance value of the hand eye coordination variable (X2) of 0.003 < 0.05, it can be concluded that the hand eye coordination variable (X2) has a significant effect on the lower passing variable in volleyball (Z). And if t count > t table, then Ho is rejected. From the SPSS output results above, it can be seen that the calculated t value > t table is 2.511 > 1.6972, so Ho is rejected so that for hypothesis 2 it can be concluded that there is a contribution of hand eye coordination (X2) to the bottom passing of volleyball (Z) of students at SDN 171 Palembang.

Hypothesis 3

Based on the significance value of the concentration variable (Y) of 0.004 < 0.05, it can be concluded that the concentration variable (Y) has a significant effect on the bottom passing variable in volleyball (Z). And if t count > t table, then Ho is rejected. From the SPSS output results above, it can be seen that the calculated t value > t table is 2.515 > 1.6972, so Ho is rejected so that for hypothesis 3 it can be concluded that there is a contribution of concentration level (Y) to the bottom passing of volleyball (Z) of students at SDN 171 Palembang.

Table 2. SPSS Output Results and Model 2 Path Coefficient Interpretation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	27.131	5.610		4.836	.000
	Kekuatan otot lengan	.040	.190	.380	2.152	.003
	Kordinasi mata tangan	.020	.139	.441	2.504	.003

a. Dependent Variable: konsentrasi

Hypothesis 4

Based on the significance value of the arm muscle strength variable (X1) of 0.003 <0.05, it can be concluded that the arm muscle strength variable (X1) has a significant effect on the concentration variable (Y). And if t count > t table, then Ho is rejected. From the SPSS output results above, it can be seen that the calculated t value > t table is 2.152 > 1.6972, so Ho is rejected so that for hypothesis 4 it can be concluded that there is a contribution of arm muscle strength (X1) to the concentration level (Y) of students at SDN 171 Palembang.

Hypothesis 5

Based on the significance value of the hand eye coordination variable (X2) of 0.003 < 0.05, it can be concluded that the hand eye coordination variable (X2) has a significant effect on the concentration variable (Y). And if t count > t table, then Ho is rejected. From the SPSS output results above, it can be seen that the calculated t value > t table is 2.504 > 1.6972, so Ho is rejected so that for hypothesis 4 it can be concluded that there is a contribution of hand eye coordination (X2) to the concentration level (Y) of students at SDN 171 Palembang.

Table 3. SPSS Output Results and T Test Interpretation to answer Hypothesis 6

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	20.689	7.438		2.062	.001
	Kekuatan otot lengan	.590	.394	.576	1.889	.001

a. Dependent Variable: kordinassi mata tangan

Hypothesis 6

Based on the significance value of the arm muscle strength variable (X1) of 0.001 < 0.05, it can be concluded that the arm muscle strength variable (X1) has a significant effect on the hand eye coordination variable (X2). And if t count > t table, then Ho is rejected. From the SPSS output results above, it can be seen that the calculated t value > t table is 1.889 > 1.6972, so Ho is rejected so that for hypothesis 6 it can be concluded that there is a contribution of arm muscle strength (X1) to hand eye coordination (X2) of students at SDN 171 Palembang.

DISCUSSION

The research results can be concluded that:

1. Based on the significance value of the arm muscle strength variable (X1) of 0.003 <0.05, it can be concluded that the arm muscle strength variable (X1) has a significant effect on the lower passing variable in volleyball (Z).
2. Based on the significance value of the hand-eye coordination variable (X2) of 0.003 < 0.05, it is concluded that the hand-eye coordination variable (X2) has a significant effect on the bottom passing variable in volleyball (Z)
3. Based on the significance value of the concentration variable (Y) of 0.004 < 0.05, it is concluded that the concentration variable (Y) has a significant effect on the bottom passing variable in volleyball (Z).
4. Based on the significance value of the arm muscle strength variable (X1) of 0.003 <0.05, it can be concluded that the arm muscle strength variable (X1) has a significant effect on the concentration variable (Y).
5. Based on the significance value of the hand eye coordination variable (X2) of 0.003 < 0.05, it can be concluded that the hand eye coordination variable (X2) has a significant effect on the concentration variable (Y).
6. Based on the significance value of the arm muscle strength variable (X1) of 0.001 < 0.05, it can be concluded that the arm muscle strength variable (X1) has a significant effect on the hand eye coordination variable (X2).
7. There is a contribution of arm muscle strength, hand eye coordination and level of concentration to passing volleyball at SD Negeri 171 Palembang. However, the ones that have the greatest contribution are the arm muscle strength variable (X1) and the hand eye coordination variable (X2) to the concentration variable (Y) because it is known that the R Square value is 0.447, which means that the contribution of the arm muscle strength variable (X1) and the hand eye coordination variable (X2) to the concentration variable (Y). of 77% while the value of e 2= √(1-0.447)=√0.553=0.730.

CONCLUSION

Based on the results of the analysis and conclusions of the research that the researchers have conducted, the research

intends to provide several suggestions and input for future improvements and progress, namely:

1. Schools, teachers and parents are expected to work together well to create an atmosphere so that students can concentrate on doing anything, especially to improve students' academic and non-academic achievements in the field of sports.
2. For further research, it can be used as reference material.
3. Schools are expected to prepare materials and infrastructure to improve the quality of down-passing volleyball players in order to improve their students' volleyball playing abilities.
4. In physical education learning, teachers should provide material so that students behave well in life, both in the family, school and community environments.
5. Teachers must try to improve their lower passing ability in volleyball games by increasing the number of exercises to improve their extracurricular students' lower passing ability so that they can take part in various competitions, one of which is.

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