CONTRIBUTION OF FLEXIBILITY, STRENGTH, AND BALANCE ON THE CARTWHEEL OF PKO STUDENTS CLASS 2016

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Abstract

Objectives: This study aims at determining the contribution of biomotoric factors (flexibility, strength, and balance) on the cartwheels on PKO students of FIK Yogyakarta State University year 2016.
Methods: It is a descriptive quantitative research. The population and samples of research were 60 students of PKO year 2016. The data were obtained using survey methods with tests. The data were analysed using correlation analysis of product moment, partial correlation analysis and multiple regression analysis, and partial eta squared. The prerequisite test included normality, linearity, and multicollinearity tests.
Results: The results of the research are as follows. There are significantly positive effects ($p<0,05$) of flexibility, strength, and balance, both individually and all together on cartwheels of PKO students of FIK UNY year 2016. Flexibility, strength, and balance provide effective contribution (37.5%) on the cartwheels of PKO students of FIK UNY year 2016. Partially (partial eta squared), each of which contributed as follows: flexibility 11,0%; strength 10,7%; and balance 8,0%.
Conclusions: There is contribution of flexibility, strenght, and balance on the cartwheel of PKO students class 2016.

Keywords : flexibility, strength, balance, cartwheels

INTRODUCTION

Basic gymnastics skills is a compulsory subject for students of sports coaching education taking gymnastics sports specifications. This course consists of 3 credits with 1 credit for theory and 2 for practice. In the practice courses, students are given materials which consists of 2 types of exercise, fitness and gymnastics: gymnastics formation. Through fitness gymnastics training materials consisting of aerobic gymnastics, the student is expected to make a choreography gymnastics movements consisting of warming, core, cooling, while for the formation of gymnastics the training there are 12 basic motions of artistic gymnastics items, namely: split, bridge stretch, forward rolls, backward rolls, tiger vault, headstand, handstand, cartwheel, neck spring, round off, stuut, and handspring.

On the cartwheel movement there are several factors that affect the perfection of his movement. Some of the factors are the strength of the arm muscles, abdominal muscles, strength, and flexibility power. Cartwheel movement is a movement to form the blades with the prefix body facing fore and then both arms touch the floor in turn followed by the movement of the legs open as wide as possible at the top of the head so that it forms a propeller and at the end is the beginning of the movement. Cartwheel is a fairly complex movement so that physical components involved are quite a lot too. Based on the observations, the researchers are to examine the Contributions of Flexibility, strength and balance against the motion Cartwheel on Students of Sports Coaching (PKO) class 2016. As for the purpose of this research is to explore the contribution of flexibility, strength, and balance on the cartwheel movement of PKO students 2016.

Biomotor Aspects

Biomotor abilities of human motion are affected by conditions of the organ systems, i.e. neuromuscular, respiratory, circulatory, digestive, energy, and bones and joints (Sukadiyanto, 2011). (Bompa, Tudor O, 1999) added that the basic components of a biomotor include strength, endurance, speed, coordination, and flexibility. As for the other components are combinations of

several components forming a certain terminology, such power is the combination or the product of strength and speed; Agility is the combination of speed and coordination.

It is therefore easy to understand that in the training process and in the selection process, the five gymnast aspects of physical ability (physical competencies) always get serious attention. Ref. (Bompa, T or O, 1999) identifies some of the test criteria for each sport. In gymnastics, the criteria includes coordination, flexibility, power, vestibular balance, persistence, ability to overcome pressure, emotional balance, high anaerobic power, and height of lower trunk. The physiological aspects of biomotor that will be examined in this study include:

1) Flexibility, is the ability of joint to do maximum movement in the joint space. The natural motion of each joint depends on the tendons, ligaments, and muscles fibres. According to (Sukadiyanto, 2011) the flexibility contains senses of the broad motion of one or some joints. There are two kinds of flexibility i.e. (1) static flexibility, and (2) the dynamic flexibility. Flexibility take precedence in gymnastics, especially in the competitive one.
2) Balance, is the ability to maintain the attitude and position of the body rapidly upon standing (static balance) or at the time of the movement (dynamic balance). The ability to maintain balance is influenced by several factors including visual and vestibular. Static or dynamic balance is a component of physical fitness which is often performed by children and adults (Sanusi, Anwar, 2011). Even there are types or kinds of training called balance training, for example, Y balance, even the tool there is also called a balance beam.
3) Power, is one of the basic biomotor components necessary in any sport. (Sukadiyanto, 2011) states that the notions of power generally is the ability of a muscle or group of muscles to cope with the loads. In terms of neuromuscular Physiology, strength is the ability to resolve external loads and internal loads. The level of power sportsmen affected by short lengths of small muscles, big muscles, much nearby point load and fulcrum, level of fatigue, the dominance of red or white muscle types, potential muscle, exploiting the potential of the muscles, and the ability of muscle contraction . An athlete in its activities cannot be separated from exerting to overcome barriers such as overcoming weight, the equipment used and the obstacles that come from the environment or nature.

Formation Gymnastics

Body Formation Gymnastics

Formation gymnastics is one with selected movements created on purpose and planned, drawn up systematically and by using certain methods with the aim to form the ideal body posture, both in passive attitudes of standing, sitting, squatting, and lying down or in active attitudes such as walking, running, jumping, hitting, and kicking.

Balance Formation Gymnastics

Balance formation gymnastics includes balance trainings with resting on feet, resting on the hand, and resting on bottom.

METHODS

This research is descriptive research. According to (Sanusi, Anwar, 2011) states that the descriptive method is a method in researching the status of groups of human beings, objects, conditions, and systems of thought. The goal of the research is to make a description, picture, or painting in systematic, factual and accurate ways regarding the facts and relationship of the phenomena investigated. The present research took place in Faculty of Sports Science, Yogyakarta State University (FIK UNY) in May 2017. The population was the student of Faculty of Sports Coaching Education (PKO). The sample used was the PKO student year 2016.

The data were collected through surveys. As expressed by (Sugiyono, 2011) the survey method is used to obtain data from a particular place naturally (not man-made) but the researcher conducted treatment in data collection for example giving the questionnaires, tests, structured interview, and so on.

Data analysis techniques used in this research are: correlation of product moment partial correlation, and multiple regression analysis.

RESULTS AND DISCUSSION

All data on this research were obtained from tests, each participant performed tests twice and were taken for the best results. The dependent variable in this research was the cartwheel movement and the independent variable was flexibility (X_1) taken from the sit-reach test, strength (X_2) as measured by the three tests, namely, push-ups, crunches, and chin-up; as well as the balance (X_3) as measured by tests of balance. The following table presents the results of the variables

Table 1.
Statistical Analysis of Research Variables

No.	Test	Central Tendency			
		Min	Max	Mean	SD
1.	Flexibility (X_1): Sit & Reach	21.0	46.0	38.325	4.980
2.	Strength (X_2):				
	Push-Up	15	68	37.3	13.054
	Sit-Up	26	66	42.517	8.353
	Chin-Up	1.06	50.00	25.881	14.302
3.	Balance (X_3)	1.5	7.9	3.381	1.394
4.	Cartwheel Movement (Y)	5.0	8.5	7.150	0.917

The table above shows that the best score on the sit and reach test results was 46.0; tests of push-ups 68, crunches 66, chin-up 50.00; the balance of 7.9, and 8.5 for the cartwheel test results. The average test results were 38.325 for the sit and reach; 37.3 for push-ups, 42.517 for sit-up, chin-up with the average score of 25.881; balance 3.381, and 7.150 for the cartwheel.

Due to the size of the data, the data were converted into a standard score with a t-score, so that the obtained data is already standardized, so that the score can be determined the sum and average. For example in the strength test consisting of three different types of tests, the final result is the average of the three scores using the t-score.

1. **Hypothesis Testing in the Data Analysis**

Hypothesis testing in this study was performed through the techniques of partial correlation, linear regression, and multiple regression with the requirements including: (a) a test for data normality, (b) a test of linearity relationships, and (c) a test of multi-linearity. The summary of the hypothesis testing is presented in the attachment.

a. The Normality Test

Testing the normality of the data on this research was performed through Kolmogorov Smirnov Z. The results of the normality test are presented in the following table.

Table 2.
Results of the Normality Test

No	Variable	*Kolmogorov Smirnov*		Category
		KS Z	p (sig.)	
1.	Flexibility (X_1)	0,638	0,810	Normal
2.	Strength (X_2)	0,498	0,966	Normal
3.	Balance (X_3)	1,246	0,090	Normal
4.	Cartwheel Movement (Y)	1,233	0,096	Normal

The normality test summary table above indicates that all of the data in this study were normal indicated by the insignificant coefficient of Kolmogorov-Smirnov at Z-level of 5% ($p > 0.05$).

b. The Test of Linearity

The linearity test was carried out with the computer software of SPSS. From the results of the analysis, it is known that the whole F_{count} values (Deviation from Linearity) obtained the values with $p > 0.05$ the data were linear. The results of the linearity test can be seen in the following table.

Table 3.
The Results of the Linearity Test

No.	Functional Relationship	F_{count}	p	Category
1.	Flexibility (X_1) with the cartwheel movement (Y)	1,207	0,303	Linear
2.	Strength (X_2) with the cartwheel movement (Y)	1,240	0,278	Linear
3.	Balance (X_3) with the cartwheel movement (Y)	0,912	0,579	Linear

Note:

F_{count} is $F_{Deviation}$ from Linearity, which means a deviation of linearity, with $p > 0.05$ indicating linearity.

c. The Multicolinearity

The multicolinearity test aims to find out whether or not there is an overlapping relationship between variables. This test is necessary, because this study used multiple regression analysis. The multicolinearity test was carried out with a view on *Tolerance* and *VIF*. If the acquired tolerance approaches is 1, and VIF is not more than 10, then it is not multicolinearity.

Table 4.
The Results of the Multicolinearity Test

No.	Independent Variable	*Collinearity Statistics*		Category
		Tolerance	VIF	
1.	Flexibility (X_1)	0,857	1,166	Not multicolinearity
2.	Strength (X_2)	0,860	1,163	Not multicolinearity
3.	Balance (X_3)	0,886	1,129	Not multicolinearity

Based on the above table it is evident that all the independent variables in this study does not indicate the existence of multicolinearity, indicated by the value of tolerance "approaches 1, and VIF is not more than 10.

The above results determined that the data were eligible, so that it can be continued with further tests i.e. correlation product moment, partial correlation, and regression analysis.

2. Data Analysis and Hypothesis Testing

On the previous analysis, it is determined that all the data in this study meets the prerequisites of data analysis, therefore, the data can be analysed with statistical parametric analysis, i.e. the analysis of the correlation, partial correlation, and multi linear regression. The results of the analysis of the correlation of product moment presented in the following table.

Table 5.
Results of Product Moment Correlation Analysis

Correlations

		Kelentukan (X1)	Kekuatan (X2)	Keseimbangan (X3)	Gerak Meroda (Y)
Kelentukan (X1)	Pearson Correlation	1	.322*	.277*	.463**
	Sig. (2-tailed)	.	.012	.032	.000
	N	60	60	60	60
Kekuatan (X2)	Pearson Correlation	.322*	1	.273*	.459**
	Sig. (2-tailed)	.012	.	.035	.000
	N	60	60	60	60
Keseimbangan (X3)	Pearson Correlation	.277*	.273*	1	.410**
	Sig. (2-tailed)	.032	.035	.	.001
	N	60	60	60	60
Gerak Meroda (Y)	Pearson Correlation	.463**	.459**	.410**	1
	Sig. (2-tailed)	.000	.000	.001	.
	N	60	60	60	60

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

The table indicates that the correlation between independent variables and the dependent variables were significant. This is evidenced by the sig (p-value) is less than 5% ($p < 0.05$). The further analysis of multiple linear regression using the SPSS obtained the following results.

Table 6.
Results of Multi Linear Regression Analysis

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.613[a]	.375	.342	8.078

a. Predictors: (Constant), Keseimbangan (X3), Kekuatan (X2), Kelentukan (X1)

b. Dependent Variable: Gerak Meroda (Y)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2196.804	3	732.268	11.223	.000[a]
	Residual	3653.779	56	65.246		
	Total	5850.583	59			

a. Predictors: (Constant), Keseimbangan (X3), Kekuatan (X2), Kelentukan (X1)

b. Dependent Variable: Gerak Meroda (Y)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	2.669	8.392		.318	.752			
	Kelentukan (X1)	.299	.114	.299	2.625	.011	.463	.331	.277
	Kekuatan (X2)	.402	.155	.295	2.592	.012	.459	.327	.274
	Keseimbangan (X3)	.246	.112	.247	2.202	.032	.410	.282	.232

a. Dependent Variable: Gerak Meroda (Y)

The results of the regression analysis presented in the tables above determine the multi-correlation coefficient (R) of 0.613; the coefficient of determination (R^2) 0.375 and $F_{regression}$ 11.223 with significance (sig) or p-value 0.000. It turns out that the significance is less than the specified significance level, i.e. 5% ($p < 0.05$); then the $F_{regression}$ was significant meaning that the multi-correlation coefficient was significant. Thus the determination coefficient was also significant, meaning that the results of the regression analysis can be used as a basis of prediction.

The coefficient of determination of 0.375 means that the contributions of flexibility, strength, and balance on the motion cartwheel in PKO students class 2016 of 37.5%. As for the calculation of the contribution of each dependent to independent variables, can be seen in the calculation of partial eta squared and the results of the analysis with SPSS software are presented in the following table.

Table 7.
Results of Effective Contribution of Each Independent Variable
(*Partial Eta Squared*)

Tests of Between-Subjects Effects

Dependent Variable: Gerak Meroda (Y)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2196.804[a]	3	732.268	11.223	.000	.375
Intercept	6.600	1	6.600	.101	.752	.002
T_X1	449.693	1	449.693	6.892	.011	.110
T_X2	438.321	1	438.321	6.718	.012	.107
T_X3	316.254	1	316.254	4.847	.032	.080
Error	3653.779	56	65.246			
Total	155351.000	60				
Corrected Total	5850.583	59				

a. R Squared = .375 (Adjusted R Squared = .342)

The above table shows partial eta squared for flexibility (X_1) is 0.110 and this proves that the variable of flexibility contributes effectively towards the cartwheel movement of PKO students class 2016 with the amount of 11.0%. The results of the analysis on strength (X_2) determine the partial eta squared of 0.107 indicating that the variable of strength contributes effectively to the cartwheel movement on PKO students class 2016 in the amount of 10.7%. The results of the analysis on balance (X_3) show partial eta squared of 0.080 determining that the variable of balance contributes effectively to the cartwheel movement on PKO students class 2016 in the amount of 8.0%.

a. Testing the First Hypothesis

The first hypothesis in this study was "there is the influence of flexibility on the cartwheel movement of PKO students class 2016". The hypothesis is an original hypothesis or an alternative hypothesis and for the purposes of testing the hypothesis, the hypothesis is changed into the zero hypothesis (Ho), i.e., "there is no influence of flexibility on the cartwheel movement of PKO students class 2016." The results of the analysis of the correlation of product moment, partial, beta coefficient of multi linear regression analysis are presented in the following table.

Table 8.
The Influence Coefficient of Flexibility to the Cartwheel Movement of PKO Students Class 2016

Variable	Product Moment (r_{xy})	Partial Correlation	Beta Coefficient (β)	T_{count}	P
$X_1 \rightarrow Y$	0.463	0.331	0.299	2.625	0.011

From the results of the analysis of flexibility (X_1) on the variable of cartwheel (Y) on PKO students class 2016, the correlation coefficient values of product moment was 0.463 and partial correlation w 0.331; beta coefficient (β) was 0.299 and t_{count} was 2.625 with p value = 0.011. The p-value is less than the specified significance level, i.e. 5% ($p < 0.05$) and the direction is positive, therefore the correlation coefficie and the beta coefficient are significant with the direction of positive influence. Thus, e null hypothesis (Ho) was rejected, and the alternative hypothesis (Ha) was received, and it can be concluded that there was a significant positive influence flexibility on the cartwheel movement on PKO students class 2016 of FIK Y.

From the results of data analysis using partial eta squared analysis techniques, the contribution of flexibility on the cartwheel movement on student PKO 2016 FIK UNY was 11.0%.

b. Testing the Second Hypothesis

The second hypothesis in this study was "there is the influence of strength on the cartwheel movement of PKO students class 2016". The hypothesis is an original hypothesis or an alternative hypothesis and for the purposes of testing the hypothesis, the hypothesis is changed into the zero hypothesis (Ho), i.e., "there is no influence of strength on the cartwheel movement of PKO students class 2016." The results of the analy s of the correlation of product moment, partial, beta coefficient of multi linear regression analysis are presented in the following table.

Table 9.
The Influence Coefficient of Strength to the Cartwheel Movement of PKO Students Class 2016

Variable	Product Moment (r_{xy})	Partial Correlation	Beta Coefficient (β)	T_{count}	P
$X_2 \rightarrow Y$	0.459	0.327	0.402	2.592	0.012

From the results of the analysis of strength (X_2) on the variable of cartwheel (Y) on PKO students class 2016, the correlation coefficient values of product moment was 0.459 and partial correlation was 327; beta coefficient (β) was 0. 402 and t_{count} was 2. 592 with p value = 0. 012. The p-value is less than the specified significance level, i.e. 5% ($p < 0.05$) and the direction is positive, therefore the correlation coefficie and the beta coefficient are significant with the direction of positive influence. Thus, e null hypothesis (Ho) was rejected, and the alternative hypothesis (Ha) was received, and it can be concluded that there was a significant positive influence strength on the cartwheel movement on PKO students class 2016 of FIK NY.

From the results of data analysis using partial eta squared analysis techniques, the contribution of strength on the cartwheel movement on student PKO 2016 FIK UNY was 10.7%.

c. Testing the Third hypothesis

The third hypothesis in this study was "there is the influence of balance on the cartwheel movement of PKO students class 2016". The hypothesis is an original hypothesis or an alternative hypothesis and for the purp s of testing the hypothesis, the hypothesis is changed into the zero hypothesis (Ho), i.e., "there is no influence of balance on the cartwheel movement of PKO students class 2016." The results of the analy s of the correlation of product moment, partial, beta coefficient of multi linear regression analysis are presented in the following table.

Table 10.
The Influence Coefficient of Balance to the Cartwheel Movement of PKO Students Class 2016

Variable	Product Moment (r_{xy})	Partial Correlation	Beta Coefficient (β)	T_{count}	P
X_3 → Y	0.410	0.282	0.246	2.202	0.032

From the results of the analysis of balance (X_3) on the variable of cartwheel (Y) on PKO students class 2016, the correlation coefficient values of product moment was 0. 410 and partial correlation was 282; beta coefficient (β) was 0. 246 and t_{count} was 2.202 with p value = 0. 032. The p-value is less than the specified significance level, i.e. 5% ($p < 0.05$) and the direction is positive, therefore the correlation coefficient and the beta coefficient are significant with the direction of positive influence. Thus, the null hypothesis (Ho) was rejected, and the alternative hypothesis (Ha) was received, and it can be concluded that there was a significant positive influence strength on the cartwheel movement on PKO students class 2016 of FIK UNY.

From the results of data analysis using partial eta squared analysis techniques, the contribution of balance on the cartwheel movement on PKO students class 2016 of FIK UNY was 8.0%.

d. Testing the Forth Hypothesis

The third hypothesis in this study was "there is the influence of flexibility, strenth, and balance on the cartwheel movement of PKO students class 2016". The hypothesis is an original hypothesis or an alternative hypothesis and for the purposes of testing the hypothesis, the hypothesis is changed into the zero hypothesis (Ho), i.e., "there is no influence of flexibility, strength, and balance on the cartwheel movement of PKO students class 2016."

The results of multiple linear regression analysis multiple regression, which have been presented earlier, it was determined that the multiple correlation coefficient (R) was 0.613; the coefficient of determination (R^2) was 0.375; and $F_{regression}$ was 11.223 with significance (sig) or p-value of 0.000. It indicates that the significance level was less than the specified significance level, i.e. 5% ($p < 0.05$); the $F_{regression}$ was significant meaning that the multiple correlation coefficient was very significant. As seen from positive beta coefficients (β), with null hypothesis (Ho) was rejected, and the alternative hypothesis/original (Ha) was received, it can be concluded that there was a significant positive influence of flexibility, strength, and balance simultaneously on the cartwheel movement for PKO students class 2016.

From the results of regression analysis, the resulting beta constants and coefficients (β) of each variable can be made into the following regression equation:

$$\hat{Y} = 2.669 + 0.299\ X_1 + 0.402\ X_2 + 0.246\ X_3$$

Based on the regression line equation, every one rough unit increasing flexibility value are, the cartwheel movement of PKO students class 2016 will increase by 0.299 if other variables do not change. When the power rises one rough unit, the cartwheel movement of PKO students class 2016 will increase by 0.402 if other variables do not changed, and if the balance is increased one unit rough, the cartwheel movement PKO students class 2016 will increase 0.246 if other variables do not change.

The results of the regression analysis show that the multiple correlation coefficient (R) was 0.613 and the determinant coefficient of R^2 was 0.375 indicating that flexibility, strength, and balance effectively contributed on the cartwheel movement of PKO students class 2016 at

the amount of 37.5% and the remaining (62.5%) was affected by variables that are not examined in this study.

RESULTS AND DISCUSSION

In this section are presented the discussion against the results of the study, which is based on statistical analysis and hypothesis testing on top.

a. The Influence of Flexibility on the Cartwheel Movement

The first hypothesis testing proves that there is a significant positive influence of flexibility on the cartwheel movement on PKO students class 2016 of FIK UNY. This result was proved by the correlation coefficient values of product moment was 0.463 and partial correlation was 0.331; beta coefficient (β) was 0.299 and t_{count} was 2.625 with p value = 0.011. significance ($p < 0.05$).

Significant positive influence means that the higher the flexibility of the students, the higher the ability in the cartwheel movement on PKO students class 2016 of FIK UNY; and conversely the lower the flexibility of students, the lower ability in the cartwheel movement on PKO students class 2016 of FIK UNY.

The contribution of the flexibility the cartwheel movement on PKO students class 2016 of FIK UNY was at the amount of 11.0%; It is seen from the coefficients of partial eta squared of 0.110. This level of contribution was presumably large enough to increasing students' ability in the cartwheel movement through the flexibility test of *sit & reach*.

b. The Influence of Strength on the Cartwheel Movement

The second hypothesis testing proves that there is a significant positive influence strength on the cartwheel movement of PKO students class 2016 of FIK UNY. This result was proved by the correlation coefficient values of product moment of 0.459 and partial correlation of 0. 327; beta coefficient (β) of 0.402 and t_{count} of 2. 592 with p value = 0. 012.

Significant positive influence means that the higher the strength of the students, the higher the ability in the cartwheel movement on PKO students class 2016 of FIK UNY; and conversely the lower the strength of students, the lower ability in the cartwheel movement on PKO students class 2016 of FIK UNY.

The contribution of the strength the cartwheel movement on PKO students class 2016 of FIK UNY was at the amount of 10.7%; It is seen from the coefficients of partial eta squared of 0.107. This level of contribution was presumably large enough to increasing students' ability in the cartwheel movement through strength on the student, which includes push-ups, sit-ups, and chin-up.

c. The Influence of Balance on the Cartwheel Movement

The third hypothesis testing proves that there is a significant positive influence balance on the cartwheel movement of PKO students class 2016 of FIK UNY. This result was proved by the correlation coefficient values of product moment was 0. 410 and partial correlation was 0. 282; beta coefficient (β) was 0. 246 and t_{count} was 2.202 with p value = 0. 032.

Significant positive influence means that the higher the balance of the students, the higher the ability in the cartwheel movement on PKO students class 2016 of FIK UNY; and conversely the lower the balance of students, the lower ability in the cartwheel movement on PKO students class 2016 of FIK UNY.

The contribution of the balance on the cartwheel movement on PKO students class 2016 of FIK UNY was at the amount of 8.0%; It is seen from the coefficients of partial eta squared of 0.080. The contribution of it presumably large enough to increasing students ' ability in motion cartwheel through improved balance on college students.

d. The Influence of Flexibility, Strength, and Balance on the Cartwheel Movement

The results of hypothesis testing, it is evident that there is a significant positive influence of flexibility, strength, and balance simultaneously on the cartwheel movement for PKO students class 2016. This is evidenced by the values of the multiple correlation coefficient (R) was 0.613;

the coefficient of determination (R^2) was 0.375; and $F_{regression}$ was 11.223 ($p < 0.05$) revealing significant levels of correlation.

The determinant coefficient of 0.375 or 37.5% proves that flexibility, strength and balance simultaneously contributes effectively on the cartwheel movement for PKO students class 2016 at the amount of 37.5%. the rest 62.5% was determined by variables outside the research variables.

The contribution to the three variables was high i.e. 37.5%; indicating the need for training in order to increase the ability of cartwheel movement for PKO students class 2016 FIK UNY.

CONCLUSION AND SUGGESTION

Based on the results of research and discussion, it can be concluded that:

a. there is significant positive influence ($p<0,05$) of flexibility on the cartwheel movement meaning that the higher the flexibility of the students, the higher the ability in the cartwheel movement on PKO students class 2016 of FIK UNY; and conversely the lower the flexibility of students, the lower ability in the cartwheel movement on PKO students class 2016 of FIK UNY. Flexibility contributes effectively 11.0% on the cartwheel movement.
b. there is significant positive influence ($p < 0.05$) of strength on the cartwheel movement on PKO students class 2016 FIK UNY. The higher the power, the higher the capabilities in the cartwheel; In contrast the lower strength, the lower the cartwheel motion ability anyway. Strength contributes effectively towards the cartwheel at the amount of 10.7%.
c. there is significant positive influence ($p < 0.05$) of the balance on the cartwheel movement on PKO students class 2016 of FIK UNY. The higher balance, the higher the capabilities in the cartwheel; In contrast the lower the balance, the lower the cartwheel ability anyway. Balance contributes effectively on the cartwheel at the amount of 8.0%.
d. there is significant positive influence ($p < 0.05$) of flexibility, strength and balance simultaneously on the cartwheel movement of PKO students class 2016 of FIK UNY. Flexibility, strength and balance contribute effectively on the cartwheel movement of PKO students class 2016 of FIK UNY at the amount of 37.5% and the remaining 62.5% is determined by variables outside the research variables.
e. there is a need for further research related to the components of the biomotor

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