

## The Effect of Exercise and Body Height on Leg Power of Extracurricular Participants at Islamic Junior High School Roudlotus Saidiyah Semarang

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### Abstract

The goal of this study is for knowing and analyzing: The difference on the effect of depth jump exercise and knee tuck jump exercise to the ability of leg power of students involved in extracurricular activity at Islamic Junior High School Roudlotus Saidiyah Semarang, The difference of the effect of high and short of the body height to the leg power of students involved in extracurricular activity at Islamic Junior High School Roudlotus Saidiyah Semarang, The interaction between the exercise method and body height to leg power of students involved in extracurricular activity at Islamic Junior High School Roudlotus Saidiyah Semarang. This research is using the experimental method in applying the 2x2 factorial design plan. The data analysis technique is using Analysis of Variance (ANOVA) with 0.05 significance level ( $\alpha$ ). The dependent variable in this research is the method of depth jump exercise and knee tuck jump exercise. High and low body height is as the attribute variable and the dependent variable is the power legs. The results of the study are: (1) there is a difference on the effect of depth jump exercise and knee tuck jump exercise to the ability of leg power with significance level as  $(0.04) < \alpha (0.05)$  and  $F_{\text{value}} = 7.027 > F_{\text{table}} = 4.49$ , (2) there is a difference of the effect of high and short of the body height to the leg power whereas the significance =  $0.030 < \alpha = 0.05$  and  $F_{\text{value}} = 5.317 > F_{\text{table}} = 4.49$ , (3) there is an interaction between the exercise method and body height to leg power whereas the significance =  $0.027 < \alpha = 0.05$  and  $F_{\text{value}} = 8.603 > F_{\text{table}} = 4.49$ .

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## INTRODUCTION

Volleyball game is a sort of sport that has spread up in society and has been familiar among young people and adults. The achievement of this game will be getting preferable if physically and spiritually of the players are being involved harmonically through their movement so that the spirit of the players is naturally supported to the physic that the players already have (Purwanto, Yuwono & Purwanto, 2013).

Santosa (2017) declared that volleyball game is one of the society favorite sport referring to its fun. Hence it is easily shown from how many volleyball games competitions are being organized among the clubs or either among the schools in Semarang. Therefore it is necessary that the schools start to give intensively exercises to the students in referring to the ability of the students to get increased and get the best achievement.

It has been a long time ago that the volleyball game has been known in the society so that it is necessary to develop the skill how to play the game on the dexterity, the coordination, the quickness, the agility and on the high reaction along the game. This game is also require needed teamwork and team compactness, every player is recommended to master the basic technique.

Astuty, Rahayu & Sugiharto (2012) claimed that the volleyball game requires basic technique which covers skills of service, passing, spiking, setting, and blocking.

These current volleyball games have developed fast both internationally or either in Indonesia. So that it is necessary for the PBVSI (The Indonesian Volley Ball Games Federation) and especially the volleyball coaches to develop and to increase the quality of the national volleyball players (Pakaya, Rahayu & Soegiyanto, 2012).

Technique on how to play volleyball games means ways to play volleyball games efficiently and effectively regarding the rules on how to play it to achieve an optimal result (Noerjannah, 2016). The world volleyball game is organized and coordinated by an international organization named FIVB (Federation

International de Volleyball), while in Indonesia it is has done by the PBVSI (The Indonesian Volley Ball Games Federation)

Volleyball game is sort of sport which is played by two group opposite, there are six players in every group. There is another variation in how to play this game named beach volleyball whereas only two players in each group. The court of this game has 9x18 meters with 3 meters of backline from the middle line. The field edge is 5 cm wide (Yane, 2014).

The volleyball game can be played by children or adults, men or women. Regarding to the two principal on how to play volleyball: (1) technical principle, is such a player spike the ball, block the ball of the opposition and how to get score and win supportively, and (2) psychological principle, is such players who play the game happily and well coordinated with the team.

Extracurricular activity is a form of activity that is suitable for students in order to develop their talent and interest in term of education. This activity is kind of after-school activity guided by the counseling team to promote the students' needs, potentials, talents, and interests, through the proper activities coordinated by the schools (Nur, Sugiharto & Hidayah, 2018).

Jannah (2015) stated that extracurricular activity is an educational activity after school time and it is kind of counseling service from the school to engage the students in developing their needs, potentials, talents, and interests in term of activities and led by the competent teachers or tutors.

The goal of the extracurricular activity is to develop and promote optimally students' potentials, interests, talent, ability, interpersonal, teamwork, and independence in order to support the national education system.

The extracurricular activity of volleyball games in Islamic Junior High School Roudlotus Saidiyah Semarang is supervised by Mr. Setya Nugraha, which the participants are mostly from grade VII and grade VIII. Currently, these students as participants of volleyball extracurricular in Islamic Junior High School

Roudlotus Saidiyyah Semarang do not have good enough ability and skill in doing knee tuck jump.

Most of the students can not jump properly as their arms cannot reach the top of the net and their movements are not maximum so that they have difficulties in doing Smash.

Jumping in the volleyball games is one of the main keys a payer could do a variation of attacking to the opposition if a player could do maximum jump and is very well, so it's easy to vary the attack strategy. Hence the opposition will be difficult to block or to attack back.

Jumping is one of the main weapons in volleyball games to smash, block, or either to jump service, therefore in doing a jump shot is needed fit and intensive exercises in order to get a maximum jump.

Knee tuck power is a component of the physical condition of a person in using the muscle when this person is working or moving. The proper exercise used to improve the use of maximum knee tuck power is plyometric exercise with a variation of depth jump exercise method and knee tuck jump.

Depth jump is sort of plyometric exercise in order to improve the knee tuck power by jumping from a box to be landed, continuing by highly jumping to the highest point. Knee tuck jump is a kind of exercise by jumping from a flat surface area such as grass area, mattress or mat until it imprints.

Fauzi (2017) mentioned that plyometric exercise is a kind of exercise model which use own body weight to liven up power. The purpose of having plyometric exercise is to escalate explosive power whereas this kind of exercise has specific characteristic such powerful muscle contraction in responding of dynamic load or stretching in with the muscles are involved. In order to get an expected goal, it is necessary to organized exercise program plan.

## METHODS

This research is using the experimental method with a 2x2 factorial plan. The data analysis technique applied in this research is The Analysis of Variance (ANOVA) with the

significance level of  $\alpha = 0.05$ . The independent variable in this research is the exercise model of depth jump and knee tuck jump, the body height is the attribute variable, and the dependent variable is the leg power. Population in this research 36 athletes from PB CPLUSco Semarang. The sampling technique is using a purposive sample of 24 athletes. Variables in this study are independent variable (plyometric exercise), attribute variable (body height), and the dependent variable (leg power).

The normality test data is sort of test in order to describe that data is taken from populations with a normal distribution. The normality data test in this research is using Kolmogorov-Smirnov test assisted by SPSS program with a significance level of  $\alpha > 0.05$ .

Homogeneity test is sort of test taken in order to describe that two or more data groups are from the populations which have similar variations. The homogeneity test in this study is the Levene test in applying SPSS program 16.0 with a significance level of  $\alpha > 0.05$ .

Data in this study should be reliable so that data is taken by organizing a final test or post-test applying drop shot test. Before applying for an exercise program, it is previously conducted body height test by measuring students' height in order to clarify high and low category. Afterward, it is managed a pre-test by measuring jump high level.

## RESULTS AND DISCUSSION

Hypothesis testing in this research is conducted through the data analysis result and the interaction of variant analysis. In order to know the difference between these two data, it is necessary to conduct an ANOVA test where the difference is significant.

Hypothesis 1 describes there is a difference significantly between the depth jump exercise method and knee tuck jump to the power of leg which is tested using ANOVA test as a result of  $F_{\text{value}} = 7,027$  with 0.04 significance. This calculation is matched to  $F_{\text{table}}$  with numerator  $dk = 1(b-1)$  and denominator  $dk$  is  $kb(n-1)$ , the significance level is 0.05 so that the  $F_{\text{table}}$  is 4.44. As  $F_{\text{value}} > F_{\text{table}}$  or  $7.027 > 4.44$  with level

significance is  $0.004 < 0.05$  so  $H_a$  states: “there are differences between the effect of significant exercise method to the depth jump method and Knee Tuck Jump, as it is accepted”.

**Table 1.** ANOVA test

Source	df	Mean square	F	Sig.
Corrected model	3	6.778	5.215	.016
Intercept	1	64480.667	4.90383	.000
Exercise	1	13.500	7.027	.004
Body height	1	8.167	5.317	.030
Exercise * Body height	1	9.667	8.603	.027
Error	20	13.150		
Total	24			
Corrected total	23			

Hypothesis 2 describes there is difference significantly between the low body and high body to the power of leg of Islamic Junior High School students of Roudlatul Saidiyyah Semarang which is tested using ANOVA test as result of  $F_{\text{value}} = 5.317$  with  $0.030$  significance. This calculation is matched to  $F_{\text{table}}$  with numerator  $dk = 1(b-1)$  and denominator  $dk$  is  $kb(n-1)$ , the significance level is  $0.05$  so that the  $F_{\text{table}}$  is  $4.44$ . As  $F_{\text{value}} > F_{\text{table}}$  or  $6.317 > 4.44$  with level significance is  $0.030 < 0.05$  so  $H_a$  states: “there is differences between the low body and the high body to the leg power of Islamic Junior High School students of Roudlatul Saidiyyah Semarang, as it is accepted”.

There is an interaction between the low body and high body to the power of leg of Islamic Junior High School students of Roudlatul Saidiyyah Semarang which is tested using ANOVA test as result of  $F_{\text{value}} = 8.603$  with  $0.027$  significance. This calculation is matched to  $F_{\text{table}}$  with numerator  $dk = 1(b-1)$  and denominator  $dk$  is  $kb(n-1)$ , the significance level is  $0.05$  so that the  $F_{\text{table}}$  is  $4.44$ . As  $F_{\text{value}} > F_{\text{table}}$  or  $8.603 > 4.44$  with level significance is  $0.027 < 0.05$  so  $H_a$  states: “there is an interaction between the low body and high body to the power of leg of Islamic Junior High School students of Roudlatul Saidiyyah Semarang, as it is accepted”.

There is an interaction between depth jump and knee tuck jump exercise method, the body height, to the leg power. It is because these both exercises have similarity in straining the leg power in every jumping exercise. Even though good exercises have been applied, good physical

condition is needed for every athlete in order to reach the goal of the program. Therefore coaches should comprehend the physical condition of the athletes.

A coach should be able to select the proper exercise for the athletes because it is the crucial selecting the best method for the athletes so that it is beneficial in the future. Regarding the description above, there is an interaction between exercise method and body height to the leg power. The students involved in the extracurricular activity who have low and high body are properly given depth jump exercise in order to increase the power leg, it is rather than giving knee tuck jump exercise.

## CONCLUSION

Considering to the analysis and description of the study, it is concluded as follow (1) There is a difference significantly between the depth jump exercise method and knee tuck jump to the power of leg Islamic Junior High School students of Roudlatul Saidiyyah Semarang, (2) There is a difference significantly between the low body and high body to the power of leg of Islamic Junior High School students of Roudlatul Saidiyyah Semarang, (3) There is an interaction between the low body and high body to the power of leg of Islamic Junior High School students of Roudlatul Saidiyyah Semarang.

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