Correlation of Height and Arm Muscle Strength on Volleyball Serving Ability of Health Vocational School Students

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Abstract

This study aims to determine the relationship between height and arm muscle strength to volleyball serving ability by health vocational school students. This study is quantitative descriptive which tries to describe the serving ability of students volleyball in relation to height and arm muscle strength. The population of this study is all students of SMK Kesehatan Samarinda, while sampling uses purposive sampling techniques. The data collection technique uses a height test with measurements, an arm muscle strength test with a medicine ball test, and a volleyball service ability test. The data analysis technique uses descriptive analysis and inferential analysis. This analysis uses the SPSS 20.0 program using a multiple linear regression test with a significant level of α = 5%. Based on the data analysis conducted in this study, the conclusions were obtained. 1) there is a relationship between height and upper serve ability in volleyball with r count (r₀) = 0.445 (P<0.05), 2) there is a relationship between arm muscle strength and upper serve ability in volleyball with r count (r₀) = 0.635 (P<0.05), 3) there is a relationship between height and arm muscle strength together with the ability to serve the top in volleyball, there is a result of R calculation (R₀) = 0.798 (P<0.05). From the results of the study, height and arm muscle strength are known to be related to the ability to serve the top in volleyball, in general, it can be drawn a straight line that students who have height and arm muscle strength can show better serving ability over volleyball.

Keywords: Height, Weight, Volleyball Service

INTRODUCTION

Volleyball is not a new thing for the people of Indonesia, now we see that volleyball has become a sport that is always contested to achieve an achievement. The rapid increase in volleyball achievements is familiar to Indonesian people who are growing and developing, because this game can be done by the entire community network as a filler for leisure time (recreation), educational advice, achievement and as a necessity of human life. However, everything cannot be separated from the role of basic science, the high dedication of athletes in carrying out exercises in an effort to improve peak performance.

The process of sports coaching must be understood as a complex system, so the problems contained in it need to be examined from a broad perspective. Sports symptoms and activities are not solely viewed from the psychological aspect, but the socio-cultural aspect, therefore sports achievement is a compound symptom. This sport can adapt to various conditions that may arise in it. The sport can be played by several players, from two, which is very famous in beach volleyball, to six, the number of players commonly used in matches between clubs. To support the ability to serve the top in the game of volleyball, many factors are needed. These factors include, exercise factors, anthropometrics, physical condition factors. The physical condition factor in question is the strength of the arm muscles.

The importance of strength in sports activities, which states as follows: "muscle strength is a very important component to improve the overall physical condition, strength is the driving force of every physical activity. Strength plays an important role in protecting others and the
possibility of injury, since strength can run faster, unleashing kicks, hitting similarly can help to obtain stability of the joints on the other hand Anthrometry is the science that studies the structure of the human body, if a person has an ideal height it is assumed The ability to perform movements will be easily achieved as stated by Anwar Pasau (2004) Sapulete (2004) Anthropometry is a measure of the composition of human body parts, including; height, weight, limb length, chest circumference, matching circle and others. For this reason, volleyball players are required to have good physical condition, in order to be able to play consistently during the match.

Volleyball for people today has become a good sport for health, both mentally and spiritually. In this context, volleyball sports also conducts early age coaching so that it produces professional athletes technically, physically and intellectually to obtain achievements in the future. The improvement of volleyball achievements cannot be separated from advances in the field of science and technology, Reality shows that the coaching of various sports including volleyball uses the latest scientific and technological developments, which can be seen on TV, internet, or live matches. At this time, the government is paying a lot of attention to the development of young seeds in the field of sports. One of the sports that has received attention is volleyball. This sport is also applied in schools and universities and is competed as an achievement sport in various regional, national, and international events. In volleyball, it is necessary to master it as a form of basic and advanced techniques specifically. To improve the ability to play volleyball, physical factors and training factors are needed. The physical factor referred to here is strength. Strength is a component of a person's physical condition regarding the ability to use arm muscles to perform top serve in a point volleyball game. While height according to; Infant Food and Dietetic Product Department The height referred to is a measure of height/length of the body, in the form of height/length of the body as a whole. Or the length of the body parts includes the head, the body of the legs, so it can be concluded that the meaning of the height of the length of the human body is measured by the standing state measured from the tip of the foot to the tip of the crown.

Students are individuals who are growing and developing, they must always get the best guidance and direction in doing sports. Sports coaching on campus is carried out through two forms of activity programs, namely lecture activity programs which are sports activities carried out during college hours and extracurricular activities which are sports activities by students who are interested or talented in certain sports outside of college hours. Physical education students of the class of 2020 when observed have physical characteristics of height and arm muscle strength so that they can support the ability to serve volleyball. In volleyball there are several basic techniques, one of which is the ability to serve. Serve is a technique of serving the first ball in the game of volleyball. This technique is commonly used to bring the game to life because every time you start a game, you always use serve.

Volleyball serve can be improved by spinning the ball so that it is more difficult to return in line with the finish. Of the many service techniques, at this time the most popular is the flooring service that is carried out and overhanded. It is assumed that the factors mentioned above have an effect on the increase in volleyball games. In this volleyball game, there are several basic techniques, one of which is the ability to serve. To perform this service, good height and arm muscle strength are required. With the strength of height and arm muscles, it can produce better service ability. This technique is one of the techniques that needs to be mastered in playing volleyball, which is useful for obtaining points, for that an athlete must be able to master well the technique of serving ability, so that it can perform perfectly. So it is suspected that there is a relationship between height factors and arm muscle strength to volleyball service ability.

RESEARCH METHODS
The type of research used is a type of descriptive research which is research that seeks to describe a phenomenon, event, or event that is currently occurring. According to
Suharsimi Arikunto (2010) the descriptive research method is intended to collect information about the status of an existing symptom, namely the state of the symptom as it is at the time the research is conducted. The type of research used is a type of descriptive research which is research that seeks to describe a phenomenon, event, or event that is currently occurring. According to Suharsimi Arikunto (2010) the descriptive research method is intended to collect information about the status of an existing symptom, namely the state of the symptom as it is at the time the research is conducted.

**Data Analysis Techniques**

A study can use two types of analysis, namely statistical and non-statistical. Because in this study in the form of numbers, all the data obtained is height and weight data on volleyball serves. So data analysis is carried out, namely descriptively to describe in general. The analysis used to test the hypotheses of this research is using the SPSS 20.0 computer program.

**RESULTS AND DISCUSSION**

The hypothesis proposed in this study needs to be tested and proven through empirical evidence obtained in the field through tests and measurements of the variables studied, because the data of this study follows the normal distribution, so to test the hypothesis of this study, parametric analysis is used using the correlation technique from Pearson.

**Analysis of the relationship between height and volleyball service ability by health vocational school students.**

Height data was obtained by testing using measurements. To determine the closeness between height and the ability to serve volleyball by health vocational school students, Pearson correlation analysis was then carried out. A summary of the results of the analysis can be seen in the table below:

<table>
<thead>
<tr>
<th>Variabel</th>
<th>Pearson Correlation ($r_0$)</th>
<th>Signifikan $si$</th>
<th>Ket.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (X), Volleyball Top Service Ability (Y)</td>
<td>0.445</td>
<td>0.025</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Based on the table above, it can be seen that the results of the Pearson correlation calculation obtained the calculation value ($r_0$) = 0.445 ($P <0.05$), then it was rejected and accepted. This means that there is a significant relationship between height and the ability to serve volleyball by health vocational school students in the Medium category. Statistical hypothesis tested:

**The test results:**

From the results of the data analysis, the value ($r_0$) = 0.445 ($P 0.05$) was obtained. So being rejected and accepted, means that there is a significant relationship between height and the ability to serve volleyball in students. This means that, if the volleyball service has a good height by conducting a height measurement test, it will be followed by an increase in volleyball service ability.

**Hypothesis**: Tested and accepted

1. **Analysis of the relationship between arm muscle strength and volleyball service ability by students of Health Vocational School**
Table 2. Summary of the results of the analysis of the correlation and strength of arm muscles on the ability to serve volleyball by students of SMK Kesehatan

<table>
<thead>
<tr>
<th>Variabel</th>
<th>Pearson Correlation (r)</th>
<th>Signifikansi</th>
<th>Ket.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (X), Volleyball Top Service Ability (Y)</td>
<td>0.635</td>
<td>0.000</td>
<td>Signifikan</td>
</tr>
</tbody>
</table>

Based on the table above, it can be seen that the results of the Pearson correlation calculation obtained a calculation value of \( r = 0.635 \) (\( P < 0.05 \)), then it was rejected. This means that there is a significant relationship between the strength of the arm muscles and the ability to serve volleyball by health vocational school students in the Medium category.

Statistical hypothesis tested:

The test results:

From the results of the data analysis, the value \( r = 0.635 \) (\( P < 0.05 \)) was obtained. So being rejected and accepted, means that there is a significant relationship between height and the ability to serve volleyball in students. This means that, if the volleyball service has good arm strength by conducting a measurement test with a medicine ball test, it will be followed by an increase in the volleyball service ability.

Hypothesis: Tested and accepted

Data correlation analysis was carried out to determine the joint tightness of the two independent variables to the bound variable, namely the joint relationship between height and arm muscle strength to the ability to serve volleyball by students of the Health Vocational School. A summary of the results of the analysis is listed in the table below:

Table 3. Summary of the results of the analysis of the joint correlation between height and arm muscle strength on the ability to serve volleyball by students of SMK Kesehatan

<table>
<thead>
<tr>
<th>Model Summary</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>0.798*</td>
<td>0.637</td>
<td>0.610</td>
<td>1.186</td>
</tr>
</tbody>
</table>

\* a. Predictors: (Constant), Body_Height, Arm_Muscle_Strength

b. Dependent Variable: Top_Service_Capability

Based on the table above, it shows that there is a positive correlation between height and arm muscle strength together with the ability to serve volleyball by 0.798. This relationship can be qualitatively stated to be moderate, and the magnitude is more than the individual correlation between height and the ability to serve on the volleyball, as well as the strength of the arm muscles in terms of the ability to serve on the volleyball. Meanwhile, the R square (determination coefficient) is 0.403 or 40.3%. This means the magnitude of the influence of the independent variable on the change of the dependent variable. The correlation of 0.798 only applies to the sample studied, while to find out whether the correlation coefficient can be generalized or not, then the significance must be tested with the F test.

Tabel 4. Anova
Based on the table above, it can be stated that $F_{h} = 23.720$ at a significance level of 0.000 which means $H_a$ is accepted and $H_0$ is rejected means that the double correlation coefficient tested is significant, i.e. it can be applied to the entire population or it can be stated that the double correlation is significant and can be applied where the sample is taken.

**Discussion**

The results of the analysis of the relationship between the two independent variables and one bound variable in hypothesis testing as stated above, still need to be studied further to provide an interpretation of the relationship between the results of the analysis achieved and the theories underlying this research. This explanation is needed in order to know the suitability of the theories underlying this research.

The first hypothesis was rejected and $H_1$ was accepted, namely there was a significant relationship between height and the ability to serve volleyball by health vocational school students. The results obtained when associated with the framework of thinking and the underlying theories, basically the results of this study support the existing theories. This can explain that height measurement is a form of body structure to serve volleyball. As it is well known that height depends on the length of the bones that a person has, which is assumed that if a person has a sufficient or ideal height it will be easier to perform an upper serve in volleyball, compared to a player who has a short posture. A person who has a short posture in doing sports activities, the movements carried out will have a smaller angle of movement. This is intended that for people who have a short posture, will release a smaller force so that they cannot easily perform the appropriate movements. In most volleyball sports, the height invoice is the most important factor in performing services. Volleyball is a sport that has a fairly high level of difficulty, especially when serving, therefore players should have sufficient height to support the achievement of mastery of techniques in the game of volleyball, including in terms of the ability to perform services.

In the sense that the use of height can be effective and efficient in serving volleyball to Samarinda health vocational school students. The contribution of height to the ability to serve the top of the volleyball will help in making a good serve hit on the volleyball so that it can be served over the net without any difficulty.

The first hypothesis was rejected and $H_1$ was accepted, namely there was a significant relationship between arm muscle strength and the ability to serve volleyball by students of SMK Kesehatan. The results obtained when associated with the framework of thinking and the underlying theories, basically the results of this study support the existing theories. This can explain that arm muscle strength with the medicine ball test is a form of exercise to increase arm muscle strength when serving volleyball.

Strength means the ability to improve the overall physical condition. The importance of strength in sports activities, which states as follows: "muscle strength is a very important component to improve the overall physical condition, strength is the driving force of every physical activity. Arm muscle strength is also an ability that proves maximum force development and maximum contraction to limit load or drag, so the strength here is the amount of muscle tension used in a strenuous activity. The increase in strength is also followed by the size of the muscles becoming larger.
In the sense that the use of manpower can be effective and efficient in serving volleyball to Samarinda health vocational school students. The contribution of arm muscle strength to the ability to serve the top of the volleyball will help in making a good serve hit on the volleyball so that it can be served up by receiving the ball from the opponent without difficulty. The strength of the arm muscles is one of the factors that affect the achievement of achievements in the game of volleyball. "Strength or strategy is the ability of athletes when using their muscles, receiving loads in a certain working time" Therefore, the strength of the arm muscles is very necessary to support the maximum performance in passing under the volleyball. In sports, emphasis is placed on the formation of physical condition, especially on the strength of the arm muscles. So the variable of arm muscle strength in this study can be related to the ability to serve a good volleyball is a natural thing, arm muscle strength plays a very important role in sports related to limb movement, especially in volleyball bottom passing. In accordance with the theory, if the volleyball top serve is analyzed from the process of movement, then basically the element of arm muscle strength plays a role in the ability to serve the top in the game of volleyball.

The third hypothesis was rejected and accepted, namely that there is a significant relationship between height and arm muscle strength on the ability to serve volleyball by students of SMK Kesehatan. This can be explained that these two independent variables together make a real contribution to the ability to serve on the volleyball and at the same time prove that a volleyball player must know and have the strength of the arm muscles and height to serve the volleyball well.

These two variables make a real contribution to improving students' volleyball passing ability. Viewed from the perspective of coaching science, strength and height are physical potentials and body structure that must be possessed by a volleyball player. Arm muscle strength is needed when serving. "Strength is the ability of the muscle to be able to overcome resistance or load in carrying out an activity" gives a limit on strength, namely "The ability of a muscle to generate tension against strength, i.e. the ability of a muscle to generate tension against a tension". Another opinion suggests that the strength of the arm muscles is a force or muscle tension, which is more clearly a group of muscles that can be used to withstand a load at a maximum effort. Based on the explanation above, it can be said that the push-up test to increase arm muscle strength can be used in two conditions, namely when holding an action (moving) and when holding heavy weights (static).

Likewise with height as it is known that height depends on the length of the bones that a person has, which is assumed that if a person has sufficient or ideal height it will be easier to perform an upper serve in volleyball, compared to a player who has a short posture. A person who has a short posture in doing sports activities, the movements carried out will have a smaller angle of movement. This is intended that for people who have a short posture, will release a smaller force so that they cannot easily perform the appropriate movements.

In most volleyball sports, the height invoice is the most important factor in performing services. Volleyball is a sport that has a fairly high level of difficulty, especially when performing services, therefore players should have sufficient height to support the achievement of mastery of techniques in volleyball, including in terms of the ability to perform services. A conclusion can be drawn about the implications This research is the strength of the arm muscles and height can perform volleyball service to the maximum.

CONCLUSION

As a final follow-up to a scientific work is the drawing of conclusions. A clear direction and conclusion can make it easier for the reader to understand the core of the previous problem. The conclusions in the results of this study can be simply detailed as follows There was a significant relationship between height and volleyball service ability in Samarinda Health Vocational School students. There was a significant relationship between arm muscle strength and volleyball service ability in Samarinda Health Vocational School students. There was a
significant relationship between height and arm muscle strength on the ability to serve volleyball by students of SMK Kesehatan.

BIBLIOGRAPHY


