

Relationship Between Body Mass Index and VO2Max With Vertical Jump of Basketball Players

Ahmad Syafii Ade Putra
Department of Sport Science
Faculty of Sport Science
State University of Malang
Malang, Indonesia
syafiiadep473@gmail.com

Mahmud Yunus*
Department of Sport Science
Faculty of Sport Science
State University of Malang
Malang, Indonesia

Saichudin
Department of Sport Science
Faculty of Sport Science
State University of Malang
Malang, Indonesia

Slamet Raharjo
Department of Sport Science
Faculty of Sport Science
State University of Malang
Malang, Indonesia

Abstract: Basketball is a game that is played by two teams and each player has five people, each team trying to score as many as possible into the basketball hoop. The combination of basketball is defense and attack, to play well the player must master the basic basketball techniques and skills. Basketball game is not far away with physical activity to measure the ability of the game. Physical activity is one of the factors that affect the Body Mass Index (BMI), VO2Max and the height of jumping players in basketball games so that when competing can maximize the ball and snap numbers. The purpose of this study was to determine the correlation or relationship between body mass index and VO2Max with the jump height of UKM basketball players. The Body Mass Index is a tool used to determine a person's level of health from the level of obesity. VO2Max is a cardiorespiratory fitness condition and the maximum ability to consume oxygen or to measure one's endurance in carrying out activities. The height of the jump is: a jump as high as the height when passing the bar with a certain height. The research method used is quantitative research methods. The design used is to use a dual paradigm correlation of two independent variables with the help of the SPSS computer program Version 25. Obtained a correlation value of 0.417 which is not significant between body mass index and jump height, a correlation value of 0.457 which is not significant between VO2Max and height of jump while correlation of body mass index and VO2Max with high jumps showed insignificant results with a correlation value of 0.554.

Keywords—*Body Mass Index, VO2Max, Leap Height*

I. INTRODUCTION

Sports activities are often carried out everywhere without our awareness, this is inseparable from the role of the community who are aware of the importance of the sport itself, both community sports, educational sports, achievement sports and health sports. The purpose of exercising varies according to the activities carried out.

Of the various types of sports that exist, one of them is from a large ball sport that is basketball which is a sport that is loved by students besides football. In addition, basketball has invasion or mutual attack characteristics. Sports among students, especially in the Student Activity Unit of basketball or commonly called UKM UABB (Basketball Activity Unit) at the State University of Malang.

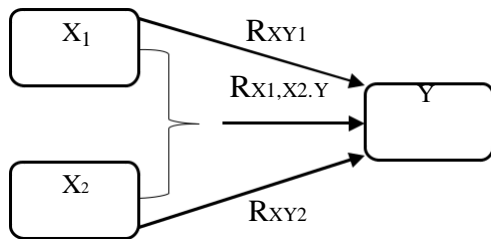
Basketball game is a game that is played by two teams and each player has five people, each team trying to score as many numbers as possible into the basketball hoop (PERBASI, 2005: 41). The combination of basketball is defense and attack, to play well the player must master basic basketball techniques and skills (Wissle, 2000: 2). The goal of basketball is to put the ball in the opponent's basket and try to prevent the opposing team from entering the ball (PERBASI, 2005: 1). Three numbers are given each ball entering outside the three-digit line, two numbers are given when the ball enters the three-digit line, one number is given when the ball enters a free shot (Jon Oliver, 2007: 8).

Basketball game is not far away with physical activity to measure the ability of the game. Physical activity is one of the factors that influence the Body Mass Index (BMI) and VO2Max. The Body Mass Index is a tool used to determine a person's level of health from the level of obesity (Romero, 2012: 64). The way to calculate body mass index is by measuring body weight (in kilograms) with the square of height (in meters) (Wayan, 2015: 2). VO2Max is a cardiorespiratory fitness condition and the maximum ability to consume oxygen or to measure one's endurance in carrying out activities.

Observations that have been made at UKM UABB on 15 April 2019 are the players needing nutrition for the body's needs during matches and training. When testing the obstacle experienced is that the endurance of players who are lacking and weak when turning the ball when rebounding.

II. METHODS

In this study, the research method that will be used is quantitative research methods. The design used is to use a dual paradigm correlation of two independent variables. Form of paradigm (Sugiono, 2016).



Information:

X1 = Body Mass Index

X2 = VO2max

Y = Jump Height

R = Correlation

Research Time and Place

This research was conducted in July 2019. The research sample was UKM State Basketball Malang players and the research site was conducted in the Horizon Tennis Court of the State University of Malang

Population and Design

1. Population

The population of this research is 13 male UKM State Basketball Basketball players.

2. Samples

The sampling process uses nonprobability sampling, with saturated sampling technique which means that all members of the population are sampled if the population is relatively small, less than 30 people (Sugiyono, 2016: 85). Therefore, the researchers took 13 basketball players from Malang State University Malang men.

Data Analysis

1. Test descriptive statistics

Descriptive tests were performed to find out the mean, median, mode, of data, VO2Max, BMI and height of the jump. as for the mean formula, median, mode (Sugiono, 2016).

2. Test for normality

Normality test is used to find out whether body mass index data, VO2Max and leap height are normally distributed or not using the level $\alpha = 0.05$ using the Kolmogorov-Smirnov significant test with the statistical application packet for science (SPSS) version 25. Kolmogorov-Smirnov significant test Test. (Sugiono, 2016)

3. Test Validity

Karl Pearson Correlation is a statistical technique used to determine the relationship between two variables. The hypothesis is based on probability: If $r < 0.05$ then $H_0 =$ rejected and $H_1 =$ accepted. If $r > 0.05$ then $H_0 =$ accepted and $H_1 =$ rejected

III. RESULTS

Body Mass Index in UKM Basketball Players of Negeeri University Malang

Measurement data of the Body Mass Index on Basketball SMEs Players shows that 12 player players (92%) have a normal Body Mass Index, while 1 player (8%) has a fat Body Mass Index.

The human body contains various major tissues of all muscles, bone tissue and internal organs. This network together forms the body. This allows the body to move, form strength and form energy products. Another type of tissue is fat (7-20%) of male body weight, that is passive body mass. According to (Pontaga, 2011: 33), fats that contain fat and fat that contain fat.

Body Mass Index is a mathematical formula calculated by adult body fat expressed in body weight (kilograms) divided by height (squares in meters) (Astutiningsih, 2014: 6).

Body Mass Index is a benchmark to find out the nutritional status that represents the condition of the body which is obtained involving the balance of energy between food intake and energy use. If food intake exceeds the need, the excess nutrition, and vice versa food intake is less than the needs, the body will lack nutrition.

BMI is a normal condition of the body that is classified as healthy because it does not have deficiencies such as excess body weight. From the results obtained, it shows that more than 92% of the players of the Malang State University Student Activity Unit have a Normal Body Mass Index. This shows that more than 94% of the players of the Malang State University Student Basketball Unit have a healthy body condition.

VO2Max on Players

From running the Multi Fitness Test (Bleep Test) conducted the results obtained by the contribution of 5 players (39%) VO2Max low category, while 6 players (46%) average category and 2 players players (15%) have a category VO2Max is enough.

Every cell needs oxygen to convert energy into ready-to-use ATP (Adenosine Triphosphate). For the work of each cell the least spent oxygen is the muscles in a state of rest. Contracted muscle cells require a lot of ATP. Buy more oxygen.

By measuring the amount of oxygen used during exercise, we find out the amount of oxygen used by the working muscles. The higher the number of muscles used, the higher the muscles that work. Fitness levels can be removed from the volume in depleting oxygen while exercising at maximum volume and capacity. The fatigue of a player or athlete is deemed to cause a lack of concentration so that the player or athlete without a prime concentration of each game.

Player Leap Height

From the results of the vertical jump test, it was obtained that 1 player (8%) had a medium high jump category, 2

players (15%) had enough categories while 9 players (69%) had a good category and 1 player (8%) has an extraordinary high jump category.

Factors affecting explosive power. Strong muscles have the right explosive power, and almost certainly have the right strength value. Increased muscle explosive power can be achieved with optimal training stimuli, namely training with high intensity and fast repetition, so that the resulting explosive power increases speed and strength also becomes greater.

The strength of a good explosive power, especially the explosive power of the leg muscles, determines a person to achieve achievement, because the limb muscles are the main center of motion for the body as a whole.

Relationship of BMI with Leap Height

Based on Karl Pearson Correlation test data shows the results of the Body Mass Index test with height jump ($r = -0.417$) it shows there is no relationship between Body Mass Index with height jump. Because eating patterns that cannot be controlled by the players are one of the reasons for the results of this study, the consumption of different foods per individual is the reason for the results of this research study.

Factors affecting jump players between other high bodies, muscle enlargement and physical fitness. Height will increase the growth of other body organs namely long arms and long legs. Increased muscle mass

IV. DISCUSSION

A. Descriptive Statistics of Data Analysis

a. Multiple modes exist. The smallest value is shown

Based on descriptive test data collected from 13 research samples found that the average value of the body mass index of the examined sample is 22.65 with a minimum score of 20.00 and the maximum value is 27.00 and the mode of BMI is 20.00 values the middle of the Body Mass Index is 22.76. As for the descriptive statistical test of VO2max the average value is 37.58 with a minimum value of 32.00 and a maximum value of 47.00 And the mode of the VO2Max value is 37.00 while the median value is 36.80

Descriptive static test of jump height obtained an average value of 53.46 with a maximum value of 72.00 and a minimum value of 34.00 And the mode value of the jump height was 59.00 and the median value was 53.00.

B. Results of research findings

The results of the research conducted by researchers from the data collection of body weight and height measurements to determine the Body Mass Index and multi-stage running test (Bleep test) to measure player jumps State University Student Basketball Activity Unit Poor.

Based on the samples taken there were 13 players Basketball Student Activity Unit State University of Malang. The data of the players who become respondents are as follows: respondents aged 17-21 years as many as 13 players Basketball Student Activity Unit State University of Malang.

Furthermore, the measurement results of the Body Mass Index by measuring body weight divided by height squared is Table 4.3 Results of BMI Measurement

NAMA	BB (Kg)	TB (m)	TB ²	IMT	KRITERIA
A Muhammad	60	1.68	2.8224	21.2585034	Normal
Anas N	60	1.66	2.7556	21.77384236	Normal
Ardiansyah R	65	1.67	2.7889	23.30668005	Normal
F. A Abdillah	67	1.65	2.7225	24.6097337	Normal
Fajar Putra	68	1.71	2.9241	23.25501864	Normal
Frido Dwi	69	1.69	2.8561	24.15881797	Normal
G Adiratna	74	1.72	2.9584	25.01352082	Normal
M Fajar Asy'hari	55	1.67	2.7889	19.72103697	Normal
M Linggar Eka P	55	1.65	2.7225	20.2020202	Normal
M Sofyan	77	1.68	2.8224	27.28174603	Obesitas
Prasetyo Probo	55	1.64	2.70602	20.32501547	Normal
Yuan Okta N	65	1.69	2.8561	22.75830678	Normal
Zaki Rangga S	58	1.67	2.7889	20.79672989	Normal

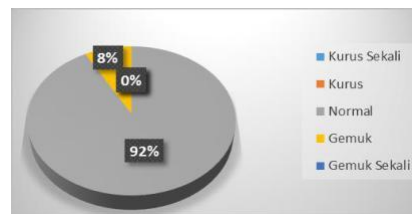


Figure 4.1 Percentage of BMI Measurement

Based on data from table 4.3 and Figure 4.1, a number of 1 players (8%) had a fat body mass index and 12 players (92%) had a normal body mass index.

The following measurements are VO2Max (bleep test) Student Activity Unit of Basketball University of Malang State University which is the research sample. Table 4.4 Measurement of VO2Max (Bleep Test)

Nama	Tingakatan	balikan	prediksi VO2Max	reting
A Muhammad	8	5	41.5	Dibawah Rata-Rata
Anas N	7	1	36.8	Dibawah Rata-Rata
Ardiansyah R	6	3	33.9	Rendah
F A Abdillah	8	4	41.1	Dibawah Rata-Rata
Fajar Putra	5	6	31.8	Rendah
Frido Dwi	6	1	33.2	Rendah
G Adiratna	9	2	43.9	Cukup
M Fajar Asy'hari	6	10	36.4	Dibawah Rata-Rata
M Linggar Eka P	10	1	47.1	Cukup
M Sofyan	5	7	32.4	Rendah
Prasetyo Probo	6	5	34.7	Rendah
Yuan Okta N	7	7	38.9	Dibawah Rata-Rata
Zaki Rangga S	7	1	36.8	Dibawah Rata-Rata

Based on data from table 4.4 and figure 4.2, there were 5 players (39%) VO2Max in the low category, while 6 players

(46%) were below the average category and 2 players (15%) had a sufficient VO2Max category.

The following is the measurement of the height of the jump (Vertical Jump) players of the Malang State University Student Activity Unit which are the research samples. Table 4.5 leap height measurement (Vertical Jump)

Name	Awal (cm)	Sesudah (cm)	Hasil (cm)	Reting
A Muhammad			52	Baik
Anas N	216	264	48	Cukup
Ardiansyah Rizki	220	275	55	Baik
F A Abdillah	212	270	59	Baik
Fajar Putra	219	272	53	Baik
Frido Dwi	216	260	34	Sedang
G Adiratna	220	265	45	Cukup
M Fajar Asy'hari	214	265	51	Baik
M Linggar Eka P	200	272	72	Excellent
M Sofyan	209	260	51	Baik
Prasetyo Probo	214	273	59	Baik
Yuan Okta N	218	277	59	Baik
Zaki Rangga S	212	269	57	Baik

Based on data from table 4.5 it is found that 1 player (8%) has a high jump in the medium category, 2 players (15%) have enough categories while 9 players (69%)

V. CONCLUSIONS

A. Conclusions

Based on the research results obtained, it can be concluded as follows:

1. Obtained a value ($r = -0.417$) is not significant from the correlation of Body Mass Index with the jump height of Basketball Players UKM State University of Malang.

2. Obtained indigo ($r = 0.457$) which is not significant from the correlation of VO2Max with the jump height of Basketball Players UKM in State University of Malang.

3. Obtained a value ($r = 0.554$) is not significant from the correlation of Body Mass Index and VO2Max with the jump height of Basketball Players UKM State University of Malang

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