

relationship between the high body and weight toward blood hemoglobin level in the teen athletes

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The relationship between the high body and weight toward blood hemoglobin level in the teen athletes

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ABSTRACT

Background and goals: Performance sports are carried out with high intensity and require excellent physical preparedness. This study aims to find out about the relationship between height, weight, and athlete's blood hemoglobin level. **Method:** This research was an analytic observational type, with a *cross-sectional study design*. The population in this study was 49 male and female athletes determining the sample with total sampling. Data were analyzed with a descriptive test, and normality Test, and *multiple correlations*. With a significance value of $p \leq 0.05$ and moderate and the direction is positive

research data were analyzed by using *software SPSS 20*. **Results:** The multiple correlation tests showed a moderate level of correlation with a value of $r_{xy} = 0.408$. The significance analysis of the value of $p = 0.015$ shows that there is a significant correlation between Height, Weight, and Blood Hemoglobin (Hb) Level with a value of $p < 0.05$. The level of moderate and significant correlation with the direction is positive correlations. **Conclusion:** there is a correlation between height, weight and blood hemoglobin level, that the level of the correlation is

Keywords: Body height, Weight and Hemoglobin

Introduction

Sports is a structured physical activity and schedule carried out with repetitive movements to improve physical fitness. Maximum physical activity can trigger an imbalance between the production of free radicals and the body's antioxidant defense system, known as oxidative stress. High-intensity exercise produces free radicals.⁴ Sports activities that affect biological function can be in the form of positive effects, that are repairing and negatively damaging body cells. Continuous physical activity with maximum intensity will cause physical

fatigue. The body must be able to adapt by involving various body systems. And exercise can be seen as a burden or stress on the mechanism of homeostasis in the body.¹⁵

The physical components related to the athlete's biometric aspects are height and weight. Both of these physical components can be observed directly by shaving the athlete directly. Athlete coaching programs are also related to nutrition issues where diet can influence the body's adaptation path to exercise training. A balance between intake and requirements. The balance between the

intake and nutritional requirements of athletes will have an impact on the athlete's physical growth and development. The teen phase is characterized by physiological maturity such as enlargement of body tissue. The growth and physical development of boys and girls are different. That the peak of growth of girls is very fast occurring around the age of 12 years and the boy's growth is very fast occurring at the age of 14 years. Adolescence is the age of growth of children toward the maturity process of adult humans.¹³ Some components of physical growth that are often used as a benchmark in assessing the growth and development of athletes, that are height, weight, and blood hemoglobin levels as a parameter of assessment of the physical status of athletes.

Height is the distance from the footwear to the highest point on the head when standing upright. Height is part of anthropometry which describes the state of skeletal growth from the sole to the tip of the head. Under normal circumstances. Biological aspects in the form of structure and body posture as well as height are one of the determinants of support for achieving peak performance. Height is a vertical direction from the floor to the upper head.¹⁸ Height is an important factor in various sports. Weight is the most easily measured growth parameter. Weight is the most important measure used in every assessment of a child's physical growth. Bodyweight is the result of an increase in all bone, muscle, fat, body fluid, and others. Weight is an anthropometric measure.¹⁸ weight is very closely related to several sports.

Hemoglobin is an important element for the human body because it plays a role in the supply of oxygen throughout the body or hemoglobin is a major determinant of VO₂Max ability.⁵ Hemoglobin has two important transportation functions in the human

body, that are the transport of oxygen from the respiratory tissue to oxygen and carbon dioxide transport.⁹ That is the ability of one hemoglobin molecule can bind four oxygen molecules.³ Hemoglobin plays a very important role in sports activities related to oxygen demand. In heavy exercise, oxygen consumption can increase by 10-20 times compared to oxygen requirements at rest.⁴

Hemoglobin (Hb) is a parameter that is widely used to determine the incidence of anemia and also hemoglobin is also used as a parameter to determine the physical condition of an athlete whether it is suitable to compete or not. Anemia has an impact on the process of growth, development, and immunity.¹² Hemoglobin functions as an oxygen-rich oxygen carrier in red blood cells and oxygen are carried from the lungs into the tissues. Muscle cells and are dependent on hemoglobin levels.¹⁴ Lack of hemoglobin causes anemia, which is characterized by symptoms of fatigue, shortness of breath, pale and dizziness. Factors affecting hemoglobin and red blood cell levels are food, age, sex, physical activity. Low hemoglobin levels are very influential in O₂ transport function which is needed a lot in the body's metabolism reaction when on the move or exercising. Normal hemoglobin levels in men are 13gr/dl and in women 12gr/ dl.¹⁷ And it is called anemia when Hb<12g/etc.² Low hemoglobin levels will have an impact on fatigue and decrease work capacity.⁷ If the athlete's Hb level is low, it will have an impact on the general decline in ability and achievement.

This study aims to find out the correlation between height, weight, and athlete's blood hemoglobin level. The results of this study can add insight into sports science, especially in the correlations between physical development and growth of athletes related to height, weight, and blood HB

levels as a parameter to determine the level of development and growth of athletes undergoing a long-term training program. And provide scientific data for trainers on athlete development, knowledge of distractions, and complaints that can hinder athletic performance improvement.

METHODS

This study was an analytic observational study, with a *cross-sectional study design*. The population in this study were male and female teenage athletes fostered by PPLP Bali with a total of 49 people. Consisting of 19 female athletes and 30 male athletes. The age range of the sample is 13 years upto 18 years. Determination of the research sample by using the total sampling method so that the total number of research samples was taken from a population of 49 people. Research data taken include height, weight, and blood hemoglobin (HB). The research instrument used in this study was the Microtoise One Med brand, height measuring by scale TANITA HD-380 and the Hemoglobin Easy Touch GcHb brand. Research data were collected directly with direct measurements on the study sample.

Data analysis in the study included: Descriptive Statistics Test to analyze variants of age, height, weight, and blood hemoglobin levels. Normality Test with *Kolmogorov-Smirnov test* to find out the distribution of research data with p-value ≥ 0.05 . And the multiple correlation test to determine the correlation between height, weight, and blood hemoglobin with a significance value of $p \leq 0.05$.

RESULT

Body Mass Index (BMI)
ResearchSubjects

To find out about the nutritional status of research subjects, the body mass index for the study subjects was calculated as shown in Table 1

Tabel 1. Distribusi frekuensi berdasarkan Indeks Massa Tubuh (IMT)

IMR	Sex				Total	
	Fem ale	%	Male	%	n	%
Thin	1	3,33	5	26,31	6	12,24
Ideal	28	93,33	14	73,68	42	85,71
Overweight	1	3,3	0	-	1	2,04
Total	30	100	19	100	49	100,00

Levels Blood hemoglobin levels by sex of the study subjects are presented in Table 2

Table 2. Frequency distribution of Blood Hemoglobin Levels (Hb)

Sex	Hemoglobin Level				Total	
	Ane- mia	%	Normal	%	n	%
Male	7	23,33	23	76,66	30	61,22
Female	2	10,52	17	89,47	19	38,77
Total	9	18,36	40	81,63	49	100

Data Normality test

The normality test with Kolmogorov-Smirnov was performed to determine the distribution of height, weight and blood hemoglobin levels. Presented in Table 3

Table 3. Variable Normality Test Of Hemoglobin, Height, And Weight

Variable	p Value
Hemoglobin	0,200
High	0,176
Weight	0,200

Correlation between height and weight on blood hemoglobin levels

Multiple correlation test was performed to determine the level of correlations between height and weight variables on blood hemoglobin levels. Presented in Table 4.

Table 4 Results of Correlation Test Of Height, Body Weight with Levels Hemoglobin (Hb)

Variable	R	p
Body height	0.408	0.015
Bodyweight		
Blood Hemoglobin Level (Hb)		

DISCUSSION

The age range of the sample was 13 years up to 18 years who still in a period of growth and development, This is following WHO limits adolescence is the age range between 10 to 19 years old.¹¹ At this age, there are still chances that are still unstable. Also due to the behavior of athletes both on diet or rest patterns that can affect the level of physical development such as height, weight, and blood hemoglobin levels which are greatly influenced by the lightweight of the exercise program carried out and nutritional intake and athlete's diet in line with the results of the Shah and Asna research in which 20% of students with anemia had a risk of eating disorders.¹⁶

Based on the results of research on male and female teen athletes fostered by PPLP Bali with a total sample of 49 people. Consisting of 19 female athletes and 30 male athletes. The results of the study variable normality test with the Kolmogorov-Smirnov test. Obtained p-value from hemoglobin (HB) variable is $p = 0,200$, p-value for height variable is $0,176$ and p-value for weight variable is $p = 0,200$. As shown in Table 3 above. And the results of the multiple correlation test showed a moderate level of correlation with a value of $r_{xy} = 0.408$ and a value of $p = 0.015$ indicates that there were significant correlations between Height, Weight, and Blood Hemoglobin Level (Hb) with a value of $p < 0.05$. With the direction of positive correlations. PPLP athletes in the province of Bali. This study is in line with the research was conducted by Acharya with the results of research on

height with significant hemoglobin with a value of $p = 0.008$ and significant bodyweight with a value of $p = 0.001$.¹

As shown in Table 2, the study sample numbered 49 people in which the study sample in the group of men had low hemoglobin levels by 7 people while in the female group low levels of hemoglobin were 2 people. Whereas 40 samples had normal hemoglobin levels.

CONCLUSION

There is a correlation between height, weight, and blood hemoglobin level, that the level of moderate category correlations with positive direction, which is signed between height, weight, and blood hemoglobin level in PPLP athletes in Bali province.

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