

The Relationship between Nutritional Status and Physical Fitness in Pilot International Standard School (RSBI) at the Level of Junior High School in Padang

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Abstract

The problem of this research is the low of level of physical fitness of students of Pilot International Standard School (SMP level) in Padang. It happened because of lack of nutritional status and physical activity. The purpose of this research is to reveal the correlation between nutritional status and physical activity, individually and in group. This research is Quantitative Reaearch that used correlational technique continued by counting the contribution of independent variables to dependent variables. The accessible population of this research was all male students (448) of RSBI school in Padang, academic year 2011/2012. The sample of this research was 67 students or 15% of accessible population by using proportional technique of random sampling. The instrument of this research to measure physical fitness (Y) was Multistage Running Test (Tes MRT) ; Nutritional Status (X1) with the measure of weight and age converted to Classification Table of Society Nutritional Status, Directorate of Community Nutrition, Department of Health of Republic of Indonesia 1999 ; and Psysical Activity (X2) with questionnaire. The results of the research are: (1).There is a significant relationship between nutritional status and physical fitness and contributed for 12.00% . (2). There is a significant relationship between physical activity and physical fitness and contributed for 26.00%. (3). There is a significant relationship between nutritional status and physical activity and contributed for 29.00%. Thus, it can be concluded that increasing the psysical fitness of RSBI students in Padang can be done by increasing Nutritional Status and Psysical Activity individually and in group.

Keywords: *The Nutriotion, Physical activity and Physical Freshness*

Introduction

As an attempt to improve the quality and competitiveness of education, an international standard education unit (school) is deemed necessary. This is mandated in Article 50 paragraph 2 of Law Number 20 of 2003 on National Education System, that: "The Government and/or Regional Governments organize at least one educational unit at all levels of education to be developed into an international standard education unit".

In accordance with the established mechanism, the realization of an International Standard School (ISS), ,

must start from the pilot stage called Pilot International Standard School. In terms of education units at the Junior High School (SMP) level in Padang, there are two schools which are in the level of RSBI called SMP RSBI including SMP Negeri 1 in West Padang Sub-District and SMP Negeri 8 in East Padang Sub-District.

The ideal condition or a point that must be realized as an SMP RSBI is the fulfillment of the Minimum Key Performance Indicator (IKKM) which contains eight elements of the National Education Standard, and the Additional Key Performance Indicator (IKKT) which contains various elements. One of the eight elements of the National Education Standards in the IKKM is the Graduation Competency Standards for Each Subject at the SMP level. One of these subjects is Physical

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Nutritional status is basically the state of a person's body health caused by consumption, absorption and use of food substances. Food substances consumed and absorbed by the body are very useful for the process of growth and development as well as a source of calories for a person to carry out activities. If a student's nutritional status is in the good category, he will certainly have a healthy body, strong, and have high resistance to disease attacks, as well as being able to carry out various daily activities well. On the other hand, students who experience more or less nutrition tend to experience impaired growth and development and are susceptible to disease. Thus, excess or lack of nutrition will surely have an impact on decreasing the level of their physical fitness.

More importantly, physical activity can simply be interpreted as various body movements produced by the muscles of the movement, which requires energy expenditure. These various body movements or physical activities are carried out spontaneously in various daily activities, both routine and free time. Students who have an active lifestyle tend to do more physical activity considering that they are more active and therefore have better physical fitness.

As it has been mentioned above, the two main factors (nutritional status and physical activity) are thought to be related to the problem of the tendency of low levels of physical fitness of SMP RSBI students, which is also exacerbated by the long study time at school. In other words, SMP RSBI students in Padang conduct learning activities from 7:00 a.m. to 3:20 p.m. or approximately 9 hours. Students who want to do homework (PR) can use the school internet which is open until 4:00 p.m. Student activity at school that is too long (7:00 a.m. to 3:20/4:00 p.m.) can cause two of the following facts: (a) students have their lunch with the snacks they buy at school which affect their nutritional status; and (b) students have limited time to do various physical activities, such as exercising in their neighborhood. Both nutritional status and physical activity are certainly related to physical fitness.

According to experts, the components of physical fitness can be divided into two groups: (a) health-related physical fitness; (b) skill-related physical

fitness. Gusril¹ explained that:

(a) health-related physical fitness consists of: cardiorespiratory endurance, muscle strength, muscle endurance, flexibility, body composition; (b) skill-related physical fitness consists of speed, power, balance, agility, coordination, reaction speed.

Physical fitness as referred to in this thesis is health related physical fitness. "health-related physical fitness is a person's ability to perform physical tasks that require strength, endurance and flexibility". Referring to the aforementioned quote,² here are some components of health-related physical fitness:

Cardiovascular endurance. The Center for Physical Fitness and Recreation affirmed:

Cardiovascular endurance is the ability of the heart, lung and blood vessel systems to function optimally at rest and work in taking oxygen and distributing it to active tissues so that it can be used in the body's metabolic processes. This is necessary to support muscle work.

Based on several components of physical fitness as stated above, Bafirman and the Center for Physical Fitness and Recreation had similar idea that⁷: "Cardiovascular endurance is the most important component of physical fitness". It indicates that cardiovascular endurance is the most important component of physical fitness since by having high cardiovascular endurance, a person will be able to carry out various activities without experiencing excessive fatigue. Meanwhile, the measure or parameter of cardiovascular endurance is a person's ability to consume oxygen optimally (maximal oxygen consumption) which is better known as $VO_2\text{max}$. It is in line with a, "The more oxygen the body uses, the more work it can do"³.

Considering cardiovascular endurance as the most important component of physical fitness, the measurement of cardiovascular endurance is more appropriate to measure a person's physical fitness. It suggested several forms of tests to measure cardiovascular endurance:

The most ideal measurement of cardiovascular conditions is carried out in a laboratory using sophisticated equipment so that definite data is obtained for each measured component. However, looking

at various limitations, such as regional conditions, expensive equipment and experts, the availability of these tools is still limited and not every province has them. These tools include treadmill, ergocycle, spirometer. Therefore, without reducing the meaning of cardiovascular measurements, various field tests can be used, including the 4.8 Km Brisk Walk test and the Multistage Fitness Test.

Research Methods

This study aims to reveal the relationship between nutritional status and physical activity either individually or in group with physical fitness of SMP RSBI students in Padang.

Based on the research objectives, this research belongs to the type of quantitative research that uses correlational analysis techniques.

This research was conducted in SMP RSBI in Padang which included: SMP Negeri 1 Padang and SMP Negeri 8 Padang.

To find out the nutritional status, the results of measurements of body weight and data on age are used as described in the following guideline:

Table 1. Nutritional Status Instrument Guideline

No	Indicators	To be measured	Measuring instrument
1	Weight and Age	a. Weight (kg) B. Age (year-month)	Body scales date/month/year of birth

Data on body weight based on the results of weighing and data on age obtained by calculating the date/month/year of birth of each sample (experimental students) were then converted to the WHO-NCHS Reference Standard/Weight Table (Kg) according to Boys Age 2-18 Years (Appendix 2). Here, the median by age of each sample (students trying) is obtained. The calculation was then done to get the median percent, by: weight divided by median x 100%.

The median percentage obtained was converted to Table Classification Table of Society Nutritional Status, Directorate of Community Nutrition, Department of Health of the Republic of Indonesia.

To measure physical activity, a questionnaire was used based on a Likert scale. The instrument was structured based on several indicators described from the following sub-variables: (a) activeness in using the physical in Physical Education, Sports and Health (Penjasorkes) practices in schools; (b) activeness in using the physical in extracurricular activities at school; (c) activeness in using the physical while playing; and (d) activeness in using the physical, seen from the penchant for exercising in the neighborhood.

“One important way to determine cardiovascular fitness is to measure the amount of VO₂max. Therefore, VO₂max or aerobic capacity is not only a metabolic parameter but also a reliable measure of physical fitness”.⁸

Considering VO₂max as a reliable measure for determining physical fitness, physical fitness measurements were carried out using the Multistage Fitness Test (MFT). This test aimed to measure the maximum oxygen uptake or VO₂max.

By using MFT, the maximum oxygen uptake (VO₂max) was determined based on the level and shuttle that the students could try.

The research data analysis technique consisted of: (1) analysis requirement testing; and (2) hypothesis testing using correlation and regression analysis..

Research Results and Discussion

The following session presents a description of the data, which is the variables to explain about data analysis to test the proposed hypothesis on Physical Fitness of SMP RSBI students in Padang. These variables are variable X₁ nutritional status and variable X₂ physical activity, and then variable Y physical fitness.

Table 2 Frequency distribution of nutritional status variable

No	Categories	F	%
1	Overnutrition	6	8.96
2	Good nutrition	40	59.70
3	Moderate nutrition	11	16.42
4	Undernutrition	5	7.46
5	Bad nutrition	5	7.46
Total		67	100.00

Based on the table above, it is known that 6 of the 67 sample students belonged to the > 120% interval class or in the category **“over nutrition”** with a percentage of 8.96%. Furthermore, it is also known that 40 students were included in the 80% - 120% interval class or in the category of **“good nutrition”** with a percentage of 59.70%; 11 students were included in the 70% - 79,9% interval or in the category of **“moderate nutrition”** with a percentage of 16.42%; 5 students were included in the 60% - 69,9% interval or in a category of **“undernutrition”** with a percentage of 7.46%; and 5 students were included in the < 60 % interval or in the category of **“bad nutrition”** with a percentage of 7.46%.

Table 3 Description of Physical Activity Data of SMP RSBI Students in Padang

No	Categories	F	%
1	Very Good	3	4.48
2	Good	23	34.33
3	Fair	19	28.36
4	Poor	18	26.87
5	Very Bad	4	5.97
Total		67	100.00

Based on the table above, 3 out of 67 students scored > 278 or were included in a **“very good”** category with a percentage of 4.48%. Moreover, 23 students scored 257 - 278 or were included in a **“good”** category with a percentage of 34.33%; 19 students scored 234 - 256 or were included in a **“fair”** category with a percentage of 28.36%; 18 students scored 210 - 233 or were included in a **“poor”** category with a percentage of 26.87%; and 4 students scored < 210 or were included in a **“very bad”** category with a percentage of 5.97%.

Table 4 Description of Physical Activity Data of SMP RSBI Students in Padang

No	Category	f	%
1	Very Good	5	7.46
2	Good	19	28.36
3	Fair	17	25.37
4	Poor	21	31.34
5	Very Bad	5	7.46
Total		67	100.00

Based on the table above, it is known that 3 out of 67 students scored > 278 or were included in a “*very good*” category with a percentage of 4.48%. Additionally, 23 students scored 257 - 278 or were included in a “*good*” category with a percentage of 34.33%; 19 students scored 234 - 256 or were included in a “*fair*” category with a percentage of 28.36%, 18 students scored 210 - 233 or were included in a “*poor*” category with a percentage of 26.87%, and 4 students scored < 210 pr were included in a “*very bad*” category with a percentage of 5.97%.

Requirement Analysis Testing

Research claimed that requirements that must be met for the use of the Compression technique are carried out with the t test, which functions as (a) data is sourced from randomly assigned data, (b) data comes from populations that are normally distributed, (c) population group has a homogeneous variance, (d) there is no significant correlation between independent variables, and (e) the relationship line between independent variable and dependent variable forms a linear line.

a.Data Normality Test

Data normality test analysis was performed using the Lilliefors test. The results of the analysis of the normality test for each variable are presented in the form of the table below, and the complete calculation can be seen in the appendix.

Table 5 Data normality test using Lilliefors test

No	Variables	Lo	Lt	Note
1	Nutritional status	0.0958	0.1082	Normal
2	Physical Activity	0.0958	0.1082	Normal
3	Physical Fitness	0.0843	0.1082	Normal

The above table shows that Lo values for nutritional status, physical activity and physical fitness variables of SMP RSBI students in Padang are smaller than Lt, or $L_{count} < L_{table}$. Thus, it can be concluded that data are normally distributed.

1. Homogeneity Test

Homogeneity test can be done by using the formula

1. Nutritional Status

$$F = \frac{535,82}{421,79} = 1,27$$

2. Physical activity

$$F = \frac{562,78}{343,50} = 1,64$$

3. Physical Fitness

$$F = \frac{37,28}{34,28} = 1,09$$

By using degrees of freedom (n1-1),(n2-1) and a significance level of 0.05 in the distribution table F, the limit of significance (F_{table}) is 1.78. Since F_{count} is smaller than F_{table}, it can be concluded that the two sample groups come from a homogeneous population.

2. Linearity Test

By using regression formula **Y = b0 + b1X1 + b2X2**, the following equation is obtained:

$$Y = 1.72 + 0.05X1 + 0.11X2$$

After getting the regression equation above, the calculation was continued by using a formula to test the meaning of multiple regression. The results are as follows:

$$\begin{aligned} JK(\text{reg}) &= b1 \sum X1Y + b2 \sum X2Y \\ &= (0.05)(2,940.6) + (0.11)(4,452.41) \\ &= 147.03 + 489.77 \\ &= \mathbf{636.80} \end{aligned}$$

$$\begin{aligned} JK(S) &= \sum Y^2 - JK(\text{reg}) \\ &= 2,316.71 - 636.80 \\ &= \mathbf{1,679.91} \end{aligned}$$

$$\begin{aligned} F_h &= \frac{JK(\text{reg}) / k}{JK(S) / (n-k-1)} \\ &= \frac{636.80 / 2}{1,679.91 / (67-2-1)} \\ &= \frac{318.4}{1,679.91 / 64} \\ &= \frac{318.4}{26.25} \\ &= \mathbf{12.13} \end{aligned}$$

$$\begin{aligned} F_t = dk_{\text{numerator}} &= 2 \\ Dk_{\text{denominator}} &= n-k-1 = 67-2-1 = 64 \\ F_t &= 3.14 \\ F_h > F_t &= 12.13 > 3.14 \end{aligned}$$

Conclusion= The multiple linear regression of X1 and X2 toward Y is significant (real).

Conclusion

Analysis of the correlation between nutritional status and physical activity on physical fitness of SMP RSBI students in Padang (X1X2 – Y). FCount 15 and F table 3.14.

Based on the results of the above calculations, it is known that the contribution of X1 and X2 to Y is 0.29 or 29.00%, while the rest is (100% - 29%) = 71.00%. It demonstrates that nutritional status and physical activity as independent variables can simultaneously contribute 29.00% to the dependent variable, namely physical fitness of SMP RSBI students. Additionally, the rest is explained by other variables outside the independent variables caused by other variables.

Source of Fund : Self

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Conflict of Interest : Nil

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