The Difference of Elementary Students' Physical Fitness Level in Accordance With School Geography

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ABSTRACT
This research is based on differences in physical fitness between elementary school students. This is because various factors are one of the geographic factors of the student's environment. This study aims to look at the differences in the level of physical fitness of elementary school students in the highlands and lowlands. This study was an ex post facto study using a comparative approach. The place of research was conducted in 2 elementary schools, that is Elementary School 01 Pasar Usang Subdistrict Batang Anai Padang Pariaman Regency, and Elementary School 13 Gunung Ganting Padang Panjang City. The population in this study amounted to 376 students. Sampling was carried out by purposive sampling technique so that the sample in this study were 83 students, namely from lowland elementary schools as many as 45 high school students and elementary schools as many as 38 students. Data collection was carried out by testing techniques on research samples. Indonesian Physical Fitness Test (TKJI) for elementary students. Data analysis with the "t-test" Independent Sample. The results of the study were that there were no significant differences in physical fitness level between elementary school students in the lowlands with physical fitness levels of elementary students in the highlands because $t_{obs}= 1.18 < t_{table} = 1.67$.

Keywords: Physical Fitness, Elementary School, Geographical Area

1. INTRODUCTION

Education is essentially a process of actualizing and enlightening the nation's life development as a whole. Therefore, education plays a role in developing aspects of life especially during the current reform era. Education basically has an important role in the intellectual life of the nation and the country where the target is to improve the quality of Indonesian, social, spiritual, and intellectual as well as professional ability as contained in Law No. 20 of 2003 (Undang-Undang Republik Indonesia Nomor 20 tahun 2003 tentang Sistem Pendidikan Nasional, n.d.) on National Education System, where the function and purpose of National Education is to develop the capability, character, and civilization of the nation for enhancing its intellectual capacity, and is aimed at developing learners' potentials so that they become persons imbued with human values who are faithful and pious to one and only God; who possess morals and noble character; who are healthy, knowledgeable, competent, creative, independent; and as citizens, are democratic and responsible[1].

Expectation towards education in order to actualize the fully Indonesian includes the psychological and physical aspects. The education that takes place in the school is contained with an improved curriculum to answer the cpplenges of the times, all subjects have their own goals, so that after the students graduate from school they will have the ability to pursue his education. One of these subjects is physical education and sport.

Because of the importance of education and physical freshness, the efforts are undertaken by conducting sports coaching, as well as by carrying out sports activities regularly [2]. Coaching and development of sport are parts of the effort to improve the quality of the fully Indonesian that are directed to improve physical health, mental, and spiritual of society. In order to improve students' physical fitness, it is important to teach Physical Education since elementary school (SD) level. Activities done in school must be guided and planned to achieve the desired goals. One of the most important subjects in schools that improve students' physical fitness is physical education and health subject.

Physical education, sports and health (Penjasorkes) subject helps students in school to improve their physical fitness and help students to get rid of their boredom of theoretical lessons that they often learn. Thus, the students will be fresher and be ready to follow the upcoming lessons. In addition, by having good physical fitness students are not easily getting tired in doing their daily activities.

Physical education, sport and and health (Penjasorkes) is "a process of learning through physical activity designed to improve physical fitness, develop motor skills, knowledge, and healthy and active life behaviors, sportsmanship and emotional intelligence"[3]. Students have to be able to achieve the goals of physical education, sports and health. Physical education, sports and health itself allow students to develop the potential ability that exists in them and conduct positive and regular activities [4]. Regular physical activity will give positive impacts on students that students will get high dexterity, high learning ability and will assist in carrying out daily works without experiencing significant fatigue.

"Physical fitness is an aspect that is the physical aspect of total fitness, which gives a person the ability to

live a productive life and can adjust to each physical stress feasibly "[5].

Based on the explanation above, we know that physical fitness is a reflection of the human body organs' functions that improve the quality of life in every physical activity. The more activities a person does, the better his physical fitness level. Although Penjasorkes has been taught at every level of education starting from elementary school, every student in elementary has a different level of physical fitness.

Sekolah Dasar Negeri 01 Pasar Usang is a school located in Korong Pasar Usang Nagari Sungai Buluh, Batang Anai District, Padang Pariaman Regency. This school is in the lowlands at an elevation of 7 meters. Geographical condition that is evenly flat causing the work of the heart, respiratory, circulatory system, and concentration of erythrocytes in the body do not increase while the air pressure becomes higher.

Sekolah Dasar Negeri 01 is located on the side of the Padang-Bukittinggi highway. This school has some extracurricular activities such as table tennis, volleyball, soccer, and others that are conducted outside school hours. However, there are many students do not follow those activities. In general, students go to school by public transportions and by private vehicles.

Sekolah Dasar Negeri 13 Gunung District of Ganting Padang Panjang Timur is located on the plateau at an elevation of 773 meters from the sea level. Staying in the highlands will affect human's physiological condition. The effect of this elevation thins out the level of oxygen (O2), thus the working systems of heart, respiration, and blood circulation are increasingly forced to work in order to fulfill the needs of oxygen in the body. High and tilted natural conditions cause the muscles to work harder and the cardiorespiratory system to contract more strongly, then air pollution and air pressure are reduced.

The higher the location of a place, the thinner the level of oxygen (O2) in that place. This affects the physical, heart, respiratory and circulatory activities. By depleting the oxygen (O2) level, everyone is stimulated to work to take oxygen (O2) so that oxygen (O2) requirement of a body can be filled. On the other hand, the lower the place, the more oxygen (O2) level in that place, this will weaken the circulatory and respiratory systems.

In general, students of Sekolah Dasar Negeri 13 go to school on foot walking uphill and downhill. In addition, activities done outside school hours are assisting their parents in the fields (rice fields).

Both schools have different environmental conditions, especially the height of the place. There is difference in elevation between the two. Meanwhile, the curriculum used in both schools is the same.

2. METHODOLOGY

This is an ex post facto research design using a comparative method. This study intends to see the difference in physical fitness level of elementary students in the lowlands (SD Negeri 01 Pasar Usang, District of Batang Anai Padang Pariaman Regency) and elementary students in the plateau (SD Negeri 13 Gunung Ganting Padang Panjang Timur).

This study was conducted in 2 schools namely Sekolah Dasar Negeri 01 Pasar Usang District of Batang Anai Padang Pariaman Regency and Sekolah Dasar Negeri 13 Gunung District of Ganting Padang Panjang Timur

The population of this study were 231 students of Sekolah Dasar Negeri 01 Pasar Usang and 145 students of Sekolah Dasar Negeri 13 Gunung.

The participants were selected by using purposive sampling technique so that the participants in this study were 83 students with following details: 45 elementary students from the lowland, and 38 elementary students from the plateau.

Data were collected through a series of test done by the participants. Indonesian Physical Fitness Test (TKJI) for elementary students. Has 5 test items consisting of: a) 40 meters Running, b) 30 Seconds Pull-Up, 3) 30 Seconds Sit-Up, 4) Vertical Jump, and 5) 600 meters Running[6]. Data then were analyzed using t-test independent sample.

3. RESULT AND DISCUSSION

a. Description of the Data

Based on the explanation and descriptions mentioned previously, then this chapter comprises the analysis and discussion of the findings of this study. The findings of the study will be described in accordance with the objectives of the hypothesis proposed earlier.

The illustration of each data can be seen from the following descriptions:

i. The Physical Fitness Level of Elementary Students in Sekolah Dasar Negeri 01 Pasar Usang (The Lowland)

The variable of physical fitness levels was measured using the Indonesian physical fitness test (TKJI). Based on, the result of measuring the physical fitness level of 45 elementary students in the lowlands, it was obtained that the highest score was 19 and the lowest score was 12. The score distribution resulted that the mean was 15.36 and the standard deviation was 1.52. The detail information about distribution of data can be seen in the following table:

Table 1. Frequency Distribution of Physical Fitness Level of Elementary Students in Sekolah Dasar Negeri 01 Pasar Usang (The Lowland).

No	Class Interval	Frequency		Category
		Absolute (Fa)	Relative (%)	
1	5 – 9	0	0	Very Poor
2	10 – 13	6	13.33	Poor
3	14 – 17	36	80,00	Fair
4	18 – 21	3	6.67	Good
5	22 – 25	0	0	Very Good
Total		45	100	

Based on the frequency distribution table above, it can be seen that from 45 elementary students in the lowland, no one has the very good category of physical fitness score (22-25), 3 students (6.67%) have the good category of physical fitness score (18-21), 36 (80.00%) students have the fair category of physical fitness score (14-17), 6 students (13.33%) have the poor category of physical fitness scores (10-13), and no one has the very poor category of physical fitness score (5-9). For more details, it can also be seen in Figure 1 below.
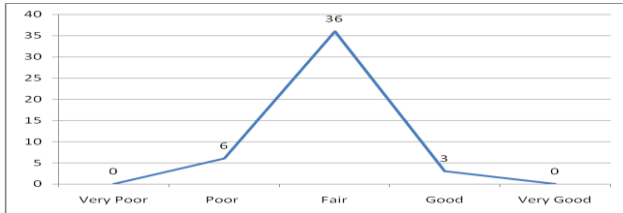

Figure 1. Physical Fitness Level of Elementary Students in Sekolah Dasar Negeri 01 Pasar Usang (The Lowland).

ii. The Physical Fitness Level of Elementary Students in Sekolah Dasar Negeri 13 Nagari Gunung District of Ganting (The Plateau)

The physical fitness level variable was measured using the Indonesian physical fitness test (TKJI). Based on the result of measuring the physical fitness level of 38 elementary students in the plateau, it was obtained that the highest score was 19 and the lowest score was 11.The score distribution resulted that the mean was 16.03 and the standard deviation was 1.59. The detail information about distribution of data can be seen in the following table:

Table 2. Frequency Distribution of Physical Fitness Level of Elementary Students in Sekolah Dasar Negeri 13 Nagari Gunung District of Ganting (The Plateau).

No	Class Interval	Frequency		Category
		Absolute (Fa)	Relative (%)	
1	5 – 9	0	0	Very Poor
2	10 – 13	2	5.26	Poor
3	14 – 17	31	81.58	Fair
4	18 – 21	5	13.16	Good
5	22 – 25	0	0	Very Good
	Total	38	100	

Based on the frequency distribution table above, it can be seen that from 38 elementary students in the plateau, no one has the very good category of physical fitness score (22-25), 5students (13.16%) have the good category of physical fitness score (18-21), 31 (81.58%) students have the fair category of physical fitness score (14-17), 2 students (5.26%) have the poor category of physical fitness scores (10-13), and no one has the very poor category of physical fitness score (5-9). For more details, it can also be seen in Figure 2 below.
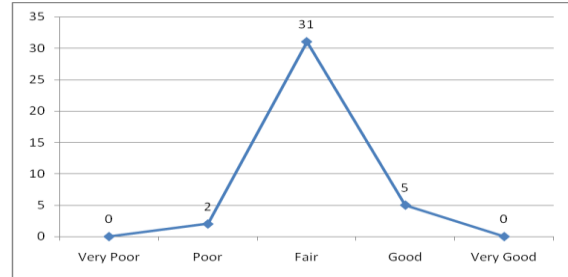

Figure 2. The Physical Fitness Level of Elementary Students in Sekolah Dasar Negeri 13 Nagari Gunung District of Ganting (The Plateau).

3.2 Data Analysis

This hypothesis of this research was tested using t-test analysis. Prior to the t-test analysis, a normality test was carried out to find out whether the data were obtained from a normally distributed population or not, and a homogeneity test was carried out to test whether the data were obtained from a homogeneous population or not.

3.2.1 Normality Test

The normality test of data distribution for the physical fitness level of students in the lowland and the plateau was analyzed statistically by Lilliefors test with a significance level that was used as the basis for rejecting or accepting a normal decision of a data distribution was $\alpha = 0.05$. A summary of the results of the Lilliefors normality test can be seen in table 3 below.

Table 3. The Summary of Normality Test Results.

No	Variable	L_{ob} serve	L_{ta} bel	Descr.
1.	The Physical Fitness of Elementary Students in Sekolah Dasar Negeri 01 Pasar Usang (The Lowland)	0.1022	0.1321	Normal
2.	The Physical Fitness of Elementary Students in Sekolah Dasar Negeri 13 Nagari Gunung District of Ganting (The Plateau)	0.1393	0.1437	Normal

Based on the table of summary normality test result above, it can be seen the obtained result between the initial test data and the final test data was Lo <Lt, so that it can be concluded that the group samples is normal distribution.

3.2.2 Homogenity Test

Homogeneity test of data distribution between the physical fitness level of students in SD Negeri 01 Pasar Usang (the lowland) and the physical fitness level of students in SD Negeri 13 Nagari Gunung (the plateau) were analyzed statistically by F test using degrees of freedom and significance level of 0.05 in the table of Distribution F. Summary of Homogeneity Variance test results can be seen in the following table:

Table 4. The Summary of Homogeneity Test Results.

$F_{observe}$	F_{table}	Descr.
1,07	1,88	homogeneous

Based on the table of the summary of homogeneity test result above, it can be seen that the obtained result of the homogeneity test between the data of physical fitness level of students in the lowland and the plateauis $F_{observe} < F_{table}$, so it can be concluded that the sample group has homogeneous variance. In other words it can be concluded that the sample comes from a homogeneous population.

3.2.3 Hypothesis Testing

Data were analyzed by calculating the difference of the physical fitness level of students in SD Negeri 01 Pasar Usang (the lowland) and the physical fitness level of students in SD Negeri 13 Nagari Gunung (the plateau). The statistical test used was the t test that meant to see the effect of the mean in the same group at a significance level of 0.05. The results of the analysis showed that:

Table 5. The Summary of Hypothesis Testing Results.

Data	$T_{observed}$	t_{table}	Descr.
Physical Fitness Level	1.18	1.67	Ho is Accepted Ha is Rejected

Based on the results of data analysis in the table above, it can be seen that Ho is rejected and Ha is accepted. This can be seen where $t_{obs} = 1.18 < t_{tab} = 1.67$. So it is concluded that there is no significant difference in the physical fitness level between elementary students in the lowlands and the physical fitness levels of elementary students in the plateau.

3.3 Discussion

The discussion in this study was carried out based on theoretical reviews and statistical calculations, and referred to the conclusions of the analysis that had been conducted, then further discussion would be conducted. This discussion will refer to the hypothesis proposed in the study.

The Difference of Physical Fitness Level of Elementary Students in SD Negeri 01 Pasar Usang (The Lowland) and Physical Fitness Level of Elementary Students in SD Negeri 13 Nagari Gunung (The Plateau). Based on the results of the hypothesis testing analysis, it was obtained that t_{obs} (1.18) <t table (1.67) at the significance level of $\alpha = 0.05$. So, it can be concluded that Ho was accepted and Ha was rejected. Thus, there was no significant difference in the level of physical fitness that is between elementary students in the lowlands with physical fitness levels of elementary students in the plateau.

Suggests that physical fitness is an ability that focuses on physiological functions, i.e. the ability of the heart, blood vessels, lungs, and muscles function at optimal efficiency [7] So, based on this explanation, it can be seen that the physical fitness is closely related to the function of the cardiovascular respiratory (heart, lung and blood circulation).

A person who has a good level of physical fitness means that he has a good level of fitness and health. With this level of fitness and health, a person will be able to work without experiencing significant fatigue.

Every student is required to have good physical fitness during learning activities. Students who have good physical fitness will be fit and health and tend to succeed during learning activities. Students who are not fit and health tend to experience obstacles in during learning activities. Thus, students who have a good level of physical fitness tend to be able to improve their physical endurance and learning activities in order to actualize learning achievement in school as expected.

Explain that physical fitness is the ability of one's body to adjust to physical loading without causing excessive exhaustion [8]. To increase physical fitness, it is necessary to do regular exercises and daily worksin order to improve thinking skills

From the explanation above, it can be seen that students who have good physical fitness will be able to do the learning activities for a long period of time and are not easily tired in carrying out every task given by the teacher at school. On the other hand, students who are not fit, they will be easily tired and sleepy and not enthusiastic in participating during learning activities at school.

Physical fitness is influenced by many factors including the environment in which a person lives, e.g. the lowland and the plateau. The difference in geographical conditions of these place will cause different adaptation to the body. Adaptation is the process of adjusting to the environment. Adaptation is a process of change in order to adapt to the environment. One example of adaptation is the community in the plateau produce lots of amount of hemoglobin in the blood to help the processof oxygen binding in the blood because in the plateau the oxygen content is very minimal.

The plateau environments have different conditions with the lowland including the composition of air, oxygen pressure, topography, weather, type and composition of soil, habitat, etc. which all require different types and sizes of physical activity. This environmental stress will arise before this adaptation is carried out. Stressors will trigger adjustments to body conditions. If the stressor is too strong and occurs in a short time, it is difficult for the body to adjust to extreme conditions.

By increasing altitude then the barometer pressure decreases and also air density. The air environment in the plateau with low pressure and oxygen levels is a main factor that influence on the physical and physiological adaptation of humans living in the plateau. Low atmospheric pressure in the plateau creates environmental problems that cannot be modified by human intervention until this century.

Physiologically, the most important environmental stress is hypoxia. Hypoxia is the condition when oxygen

deprivation of simtoma in body tissues that occurs due to the influence of levitation difference. In fatal cases it can result in coma, even to death. However, if it has been some time, the body will immediately and gradually return to normal body condition. Symptoms noticed in hypoxia include nausea, shortness of breath, and dizziness. Hypoxia in the plateau is a stress that is not easily modified by humans with cultural responses and behavior and even further, all organ systems are affected by hypoxia.

Based on the statistical test proving, it was concluded that there was no significant difference in the physical fitness level of elementary school students in the lowland and the elementary students in the plateau. This means that the geographical location of the school does not significantly affect students'physical fitness because many other factors also influence the physical fitness such as training and nutritional status.

Training is a factor that plays an important role in improving students' physical fitness because training will also cause adaptation to the physiology of the student's body. With the adaptation to the loading of the training carried out, there will also be an increasing in physical fitness. Trainings that affect and increase physical fitness are routine and continuous trainings. training can improve an individual's abilities[9]. where trainings can cause changes in the cardiorespiratory system[10]. This means that by doing physical activity, physical fitness will be increased. physical activity has a positive relationship to physical fitness[11].

For elementary school students, besides training, the other factor that influence physical fitness is nutritional factors because nutrition is very necessary for students as at this age students are still in their infancy so they need good nutrition. In addition, to be able to move well, students also need nutrition as energy. This is in line with the results of [17] which explains that the nutritional status of students contributes to physical fitness of elementary school students by 14.08%.

Moreover, many other factors affect the physical fitness of elementary school students such as student motor skills, health[12], age, gender, BMI [13], energy intake [14] and training frequency.

4. CONCLUSION

Based on data analysis and discussion above, it can be concluded that there is no significant difference in the level of physical fitness of elementary students in the lowland and elementary students in the plateau. Many other factors influence the physical fitness of elementary school students such as student motor skills, health, age, gender, BMI, energy intake, frequency of training, nutrition and training.

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