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- BIOMECHANIKA UKŁADU RUCHOWEGO I STOMATOGNATYCZNEGO; ORTOPODOLOGIA;
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The effect of traditional sports on improving the physical fitness of elementary school students

Wpływ tradycyjnych sportów na poprawę sprawności fizycznej uczniów szkoły podstawowej

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Abstract

Introduction. Human resources are generally directed at making people who are tough, skilled, capable, enthusiastic and productive, so that they have the ability to carry out various activities in society. **Aim.** This study aims to: (1) find out how much influence traditional sports have on improving the physical fitness of elementary school students; and (2) knowing the more effective frequency of traditional sports training to improve physical fitness. **Methods.** This type of research is a quasi-experimental. Data collection techniques with tests. The instrument used is the Indonesian Physical Freshness Test (TKJI) for children aged 10-12 years to find out the increase in physical fitness of early childhood. The population in the study were all fifth grade students at SD Muhammadiyah Condong Catur Yogyakarta, totaling 160 students. The sampling technique was simple random sampling, the sample in this study were 48 students who were divided into 3 groups namely treatment group A, treatment group B and control group. Each group has 16 students consisting of 8 boys and 8 girls. The data analysis technique in this study used the ANOVA test with the initial prerequisite tests being the normality test and homogeneity test, then to see the differences in each treatment group it can be seen from the results of the simultaneous comparison analysis and the results of the average difference with the Scheffe test. **Result.** The results of the study seen from the results of the average level of physical fitness for the three groups there is a significant difference. Based on the Scheffe test, the results showed that the best level of physical fitness was in the treatment group A or the group that was given the traditional exercise treatment with a frequency of 4 times a week. The treatment group B had a significant increase compared to the control group which did not experience an increase. **Conclusion.** From this study it can be concluded that traditional sports can effectively improve the physical fitness of elementary school students. The frequency of exercise 4 times a week is more effective for improving physical fitness compared to the frequency of exercise 3 times a week.

Keywords

traditional sport, physical fitness, elementary school

Streszczenie

Wstęp. Zasoby ludzkie są ogólnie kierowane na kształtowanie osób wytrzymałych, umiejących, zdolnych, pełnych entuzjazmu i produktywnych, tak aby posiadały one zdolność do wykonywania różnorodnych działań w społeczeństwie. Cel. Celem badania jest: (1) ustalenie, jak duży wpływ mają tradycyjne sporty na poprawę sprawności fizycznej uczniów szkoły podstawowej; oraz (2) poznanie, która częstotliwość treningów sportów tradycyjnych jest bardziej efektywna w poprawie sprawności fizycznej. Metody. Typem badania jest badanie quasi-eksperymentalne. Techniki zbierania danych to testy. Instrumentem używanym był Indonezyjski Test Świeżości Fizycznej (TKJI) dla dzieci w wieku 10-12 lat, aby dowiedzieć się o wzroście sprawności fizycznej wczesnego dzieciństwa. Populacja w badaniu to wszyscy uczniowie piątej klasy w SD Muhammadiyah Condong Catur w Yogyakarta, w sumie 160 uczniów. Technika próbkowania był prosty losowy dobór próby, w badaniu próbka składała się z 48 uczniów, którzy byli podzieleni na 3 grupy: grupę leczoną A, grupę leczoną B i grupę kontrolną. Każda grupa liczyła 16 uczniów, składających się z 8 chłopców i 8 dziewcząt. Technika analizy danych w tym badaniu użyła testu ANOVA, z początkowymi testami warunków wstępnych jako test normalności i test homogeniczności, następnie do zobaczenia różnic w każdej grupie leczonej można było użyć wyników analizy porównania jednoczesnego oraz wyników różnicy średnich z testem Scheffego. Wynik. Wyniki badania widać z poziomu średniej sprawności fizycznej dla trzech grup, istnieje znacząca różnica. Na podstawie testu Scheffego wyniki pokazały, że najlepszy poziom sprawności fizycznej był w grupie leczonej A, czyli grupie, która była poddana zabiegom ćwiczeń tradycyjnych z częstotliwością 4 razy w tygodniu. Grupa leczona B miała znaczący wzrost w porównaniu do grupy kontrolnej, która nie doświadczyła wzrostu. Wnioski. Z tego badania można wywnioskować, że sporty tradycyjne mogą efektywnie poprawić sprawność fizyczną uczniów szkoły podstawowej. Częstotliwość ćwiczeń 4 razy w tygodniu jest bardziej efektywna w poprawie sprawności fizycznej w porównaniu do częstotliwości ćwiczeń 3 razy w tygodniu.

Słowa kluczowe

sport tradycyjny, sprawność fizyczna, szkoła podstawowa

Introduction

The development of human resources is generally directed at making people who are tough, skilled, capable, enthusiastic and productive, so that they have the ability to carry out various activities in society. Meanwhile, from the other side the development of human resources is very closely related to the level of human physical fitness itself. Physical education has relevance to the development of human resources through the context of motor activity which has an impact on increasing the knowledge of a human being [1]. The current development of science and technology plays a significant role in this context. The use of technology, in this case gadgets, will hinder children's motor development [2]. Every country, including Indonesia, faces the challenge of improving and maintaining the physical fitness of its citizens, especially for developed countries where people have greatly reduced their physical activity, so it not uncommon to cause disturbances in the body's organsystems.

Lack of physical movement in children can be seen from the less often children do activities such as running, pedaling, jumping, throwing, and playing games outside the home with their peers either in hot or rainy weather. The decrease in physical activities among children in several countries is currently considered a public health problem [3]. Children prefer to be at home sitting in front of televisions and computers to play games, even though these games do not make children move much and this is supported by parents who provide these game facilities so that their children do not play outside the home. Currently, many parents still do not understand the importance of exercise for children. This lack of awareness can negatively affect children's growth, development, and physical fitness of children, for example after coming home from school children are immediately ordered to take lessons where the lessons chosen by parents are those that prioritize cognitive skills such as math, science, English, and music tutoring, only a few parents choose psychomotor tutoring for their children such as football, volleyball, badminton, swimming and so on. Playing activity is an excellent tool to encourage a healthy lifestyle for children [4].

One form of play activity is found in traditional sports, traditional sports can also be used as a tool and effort to encourage

a healthy lifestyle for children. By carrying out traditional games, it can have an impact on students' motivation in taking part in physical education learning for the better [5]. When student learning motivation increases, it can direct students to have a good level of fitness. Traditional sports are now very rarely used anymore as a means to improve physical fitness, this can be seen from the facts on the ground that traditional sports are not practiced by people, especially people who live in urban areas, and are also not taught in schools. Traditional sports are game activities that are passed down from one generation to the next in an area [14]. Traditional sports involve physical activity and running movements and throwing objects, which causes children to teenagers to like playing this game [15].

Several previous studies stated that traditional sports can improve physical fitness [16]. In addition, the problems also come from the facilities, the game facilities owned by schools are very limited, for example, there are only two soccer balls available even though the number of students in one class reaches 40 students. Sports facilities are crucial as they provide students with opportunities to engage in various physical activities [6]. Limited facilities owned by schools make the learning process less attractive to children because not all children can play using adequate facilities, so children will feel bored and do not want to take part in learning properly. Through traditional sports it can actually be used as a variation in learning, but traditional sports are considered outdated and not suitable for application, because at this time many modern sports have emerged. Therefore, it needs to be analyzed in depth through research on the influence of traditional sports on improving physical fitness in early childhood. The traditional sports used in this study were gobak sodor, fort, rope jumping and sack racing. If research on traditional sports can improve physical fitness, then it can be used as an alternative in improving children's physical fitness.

Methods

This type of research is included in quasi-experimental research. This study will examine the effect of traditional sports on improving physical fitness in early childhood. The design used in this study is the Pretest-Posttest Control Group Design, which is systematically described as in Figure 1.

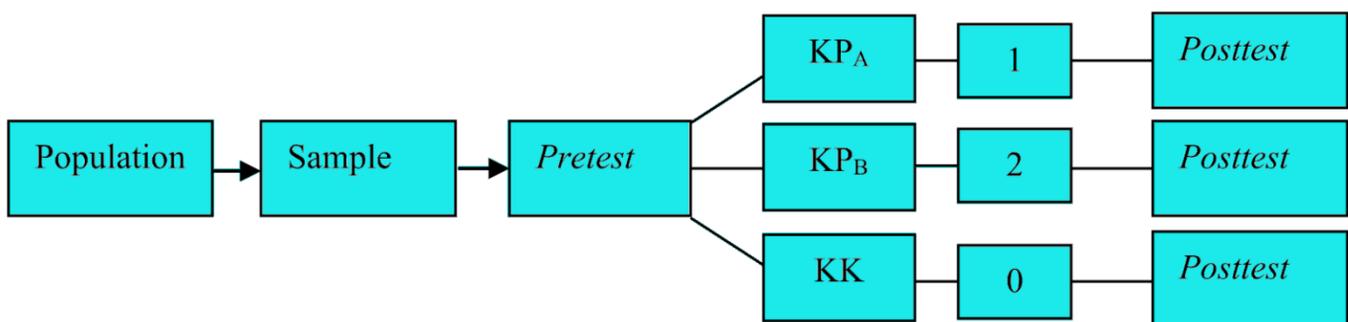


Figure 1. Research design

KPA: Treatment group A; KPB: Treatment group B; KK: Control group; 1: Traditional sports with a frequency of 4 times a week; 2: Traditional sports with a frequency of 3 times a week; 0: Without traditional sports treatment

Data collection techniques with tests. The instrument used is the Indonesian Physical Fitness Test (TKJI) for children aged 10–12 years which includes running 40 meters, hanging the elbows, lying down, jumping upright and running 600 meters. Assessment of Indonesian physical fitness is assessed using a score table (to assess the achievement of each test item) and using norms (to determine the classification level of physical fitness. TKJI in this case will function to show how a child's physical fitness is [7]. Data analysis or data processing is an important step in research. The data analysis technique used in this study is analysis of variance (ANOVA) and is assisted using the SPSS 22.0 program, but before carrying out analysis of variance, prerequisite tests are first carried out consisting of normality tests and homogeneity tests. After carrying out analysis of variance and there is a significant difference, it can be continued using the Scheffe difference test.

Results

This research was conducted with experiments, the variable measured was physical fitness. The instrument in this study was the Indonesian Jamani Freshness Test. Upon completion of the treatment, a physical fitness test using TKJI was conducted, followed by data tabulation for statistical analysis.

Pretest data

At this stage, a pretest is conducted to assess the students' initial physical fitness levels. Based on the results of the pretest, the data were sorted ordinal pairing with the A-B-C-B-A technique. Ordinal pairing is a pairing of research samples or a way of grouping samples using a ranking system, then placement of samples in each group follows the "letter S" pattern, the purpose of using ordinal pairing is to equalize the ability of the samples in each group [8]. From these results obtained treatment group A, treatment group B and the control group. The next step is the implementation stage of giving treatment to group A and group B, namely with traditional sports. Treatment group A performs traditional sports with a frequency of 4 times a week, while treatment group B performs traditional sports with a frequency of 3 times in one week.

Posttest data

After the treatment was completed, a final test (posttest) was carried out using the Indonesian Physical Fitness Test (TKJI). The final test (posttest) was carried out to find out how much influence the treatment had given to the treatment group. The posttest data were grouped based on their respective groups, namely treatment group A treatment group B and control group. After obtaining data from the final test (posttest), descriptive statistical calculations are then performed from the pretest and posttest data as shown in the table below.

Table 1. Calculation of descriptive statistical data

Source		N	Min	Max	Mean	Std Dev	Difference Mean
Treatment Group A	Pretest	16	14	16	15.31	0.793	4.63
	Posttest		18	22	19.94	1.289	
Treatment Group B	Pretest	16	14	17	15.00	1.033	2.56
	Posttest		15	19	17.56	1.413	
Control Group	Pretest	16	13	16	14.25	0.775	0.38
	Posttest		13	16	14.63	0.719	

Analysis

From the results of the descriptive statistical calculations as shown in Table 1, the analysis then proceeds with the requirements test for hypothesis analysis, which includes the following steps.

Normality test

The normality test is an assessment of data distribution. To find out the shape of the data distribution, researchers used statistical analysis and graphic distribution. The statistical analysis used was the Kolmogorov Smirnov test. Data are declared normally distributed if the significance value is greater than 0.05 or $P > 0.05$.

Table 2. Results of the normality test for physical fitness levels

Group		N	Min
Treatment Group A	Pretest	0.098	Normal
	Posttest	0.362	Normal
Treatment Group B	Pretest	0.270	Normal
	Posttest	0.285	Normal
Control Group	Pretest	0.085	Normal
	Posttest	0.069	Normal

The results of the normality test using the Kolmogorov-Smirnov test on the level of physical fitness in treatment group A for the pretest and posttest gave normal distribution of data results. In the treatment group B the pretest and posttest gave the results that the data were normally distributed, and in the control group the pretest and posttest gave the results that the data were normally distributed. Based on the calculation of the normality test with the Kolmogorov-Smirnov it can be concluded that the data from all groups are normally distributed.

Homogeneity test

The homogeneity test in this study used Lavene Statistics with the F test. The homogeneity of variance test assesses a key assumption in ANOVA: the equality of variances. If the significance value > confidence level ($P > 0.05$) means homogeneous, while if the significance value < confidence level ($P < 0.05$) means it is not homogeneous. As for the calculations, the results are as follows.

Table 3. Pretest-posttest homogeneity test results for physical fitness levels

Physical fitness level	Lavene statistic	Significance
Pretest	0.364	0.697
Posttest	2.996	0.060

The results of the calculation of the homogeneity of variance test with Lavene Statistics showed a pretest value of 0,364 with a significance of 0,697 and a posttest value of 2,996 with a significance of 0.060. Because the significance value is greater than the level of confidence, the decision taken is to accept H0. This means that the variances of the physical fitness levels of the three groups at the pretest and posttest are the same (homogeneous). With these results, ANOVA testing using the F test can be carried out.

Hypothesis testing

The hypothesis of this study posits that traditional sports can improve physical fitness in early childhood. To test this hypothesis, the ANOVA test was used, this test was intended to test the average difference from the control group to the other groups, namely treatment group A and treatment group B at the time of pretest and posttest measurements with the provisions: if the F_{test} value > F_{table} value then H0 is rejected and H1 is accepted. Based on the calculations, the results are as shown in table 4 below.

Table 4. Pretest-posttest ANOVA test results for physical fitness levels

Physical fitness levels	Mean	F_{test}	F_{table}	Significance
Pretest	14.85	6.234	3.21	0.000
Posttest	17.38	81.422	3.21	0.000

From the results of the calculation above, it can be seen that FUji value for the pretest is 6.234 and the F_{test} value for the posttest is 81.422 with a significance level of 0.000. While the critical value F_{table} for $\alpha = 0.05$; $df1 = 2$ and $df2 = 45$ is $0.05 = 3.21$, with these results a decision can be taken to reject H0 because the F_{test} value for the pretest and posttest is greater than the F_{table} value. Thus, the research hypothesis is accepted. The conclusion obtained is that the average level of physical fitness for the three groups is significantly different.

Scheffe's test

To find out which of the treatments given to groups were significantly different, the researcher used the Scheffe test. In the Scheffe test there are two types of results, namely the simultaneous comparison analysis and the analysis of the average difference. Simultaneous comparison at pretest and posttest between treatment group A, treatment group B and control group. Once it is known that there are differences in the level of physical fitness for each group, then to see these differences can be seen in the results of simultaneous comparison analysis (multiple comparisons).

Table 5. Comparison of simultaneous pretest physical fitness levels

Group	Group	Average difference	Significance
Group A	Group B	0.313	0.604
	Group C	1.063*	0.005
Group B	Group A	-0.313	0.604
	Group C	0.750	0.063
Group C	Group A	-1.063*	0.005
	Group B	-0.750	0.063

Table 6. Comparison of simultaneous posttest physical fitness levels

Group	Group	Average difference	Significance
Group A	Group B	2.375*	0.000
	Group C	5.313*	0.000
Group B	Group A	-2.375*	0.000
	Group C	2.938*	0.000
Group C	Group A	-5.313*	0.000
	Group B	-2.938*	0.000

From the results of the analysis with simultaneous comparisons (multiple comparisons) above, it can be seen that the asterisk (*) on the average difference or Sig value is smaller than alpha (5%), it is found in pairs of group A–group C, group C–group A in the pretest simultaneous comparison, so there are only 2 different groups. As for the posttest simultaneous comparisons, there are pairs of group A–group B, group A–

group C, group B–group A, group B–group C, group C–group A, group C–group B. So each group is different from one another.

The average difference in pretest and posttest physical fitness levels between the control group and treatment group A and treatment group B. To see the differences in the groups can be seen in the results of the average difference.

Table 7. Differences in average pretest physical fitness levels

Group	N	Subset for alpha = 0,05	
		1	2
Group A	16		15.31
Group B	16	15.00	15.00
Group C	16	14.25	
Significance		0.063	0.604

The results of testing the difference in the average level of physical fitness show that there are two different average columns. The first column is a group that has the same level of physical fitness, namely group B and group C with a signifi-

cance value of 0.063. Whereas for the second column are groups that have the same average level of physical fitness consisting of group A and group B with a significance value of 0.604.

Table 8. Differences in average posttest physical fitness levels

Group	N	Subset for alpha = 0,05		
		1	2	3
Group A	16			19.94
Group B	16		17.56	
Group C	16	14.63		
Significance		1.000	1.000	1.000

Information: Column 1* = Column for the lowest group (level 3); Column 2* = Column for middle group (level 2); Column 3* = Column for the highest group (level 1)

From these results it can be seen that the average fitness level for the three groups is divided into three different columns. By looking at the distribution of these columns, it can be seen that all groups have different average levels of physical fitness. The highest level of physical fitness was in group A with an average value of 19.94, and the average value of the level of

physical fitness for group B was 17.56. The lowest level of physical fitness is group C with an average value of 14.63. The best level of physical fitness was in group A or the treatment group which was given traditional sports treatment with a frequency of 4 times a week.

Average Result of Indonesian Physical Freshness Test Calcu-

lation The implementation of the traditional sports treatment was carried out in 24 meetings, in each of the 6 meetings a test was carried out to find out whether the

treatment had an impact on increasing physical fitness. To see the average calculation for each test is presented in table 9 below.

Table 9. Average Indonesian physical freshness test calculations

Group	Indonesian Physical Fitness Test				
	I	II	III	IV	V
Treatment Group A	15.31	16.00	17.69	18.94	19.94
Treatment Group B	15.00	15.38	16.19	17.06	17.56
Control Group	14.25	-	-	-	14.63

I: Pretest; II: First Mid Test; III: Second Mid Test; IV: Third Mid Test; V: Posttest

Discussion

Traditional Sports and Improvement of Physical Fitness

This study aims to determine the effect of traditional sports in improving the physical fitness of early childhood. Traditional sports offer benefits in the form of diverse motor movement experiences [17]. The traditional sports used in this study were gobak sodor, fort, rope jumping and sack racing. Gobak sodor is a traditional sport that can not only improve motor skills but can also improve students' character in everyday life [9]. Playing sack races can foster self-confidence for students [10]. Additionally, these traditional sports were selected for their accessibility and low cost of required facilities and infrastructure. They do not require a large or specialized area, allowing them to be played anywhere. This traditional sport is played in the form of team or group games, this is because children will feel happy and have a challenge playing it in order to win the game and beat their opponents. In contrast to individual games, children will feel bored quickly and are not enthusiastic about playing them.

The chosen traditional sports can enhance physical fitness, as they involve the use of the entire body during play. The components of physical fitness in the game include cardiovascular endurance, muscle strength, flexibility, balance, power, speed, agility and coordination. So that these traditional sports can be used as an alternative in improving children's physical fitness.

Level of Physical Fitness Treatment Group A

The research conducted in treatment group A showed a significant increase in physical fitness compared to treatment group B and the control group, as evident from the differences between the pretest and posttest average values. The pretest average score is 15.31 and the posttest average score is 19.94 so the difference is 4.63. So it can be concluded that traditional exercise with a frequency of 4 times a week can improve physical fitness. In addition, traditional sports have a significant effect on improving one's basic movement skills and social attitudes [11]. This increase is illustrated in the percentage diagram depicting the average level of physical fitness, as shown below.

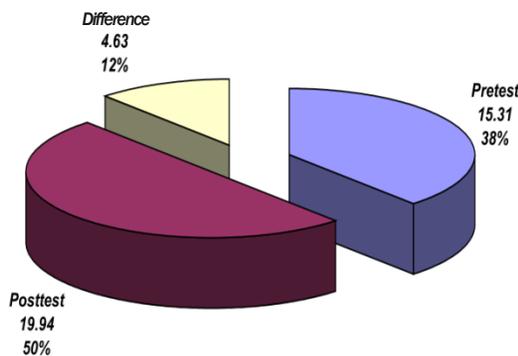


Figure 2. Percentage diagram of the average level of physical fitness for the treatment group A

Level of Physical Fitness Treatment Group B

Research that has been conducted in the treatment group B has a significant increase compared to the control group, it can be seen from the difference between the pretest average value and the posttest average value. The pretest average score is 15.00 and the posttest average score is 17.56 so the difference

is 2.56. So it can be stated that traditional exercise with a frequency of 3 times a week can improve physical fitness. Exercise can also improve mental health, reduce anxiety, sadness and depression [18]. This increase is shown in the percentage diagram of the average level of physical fitness below.

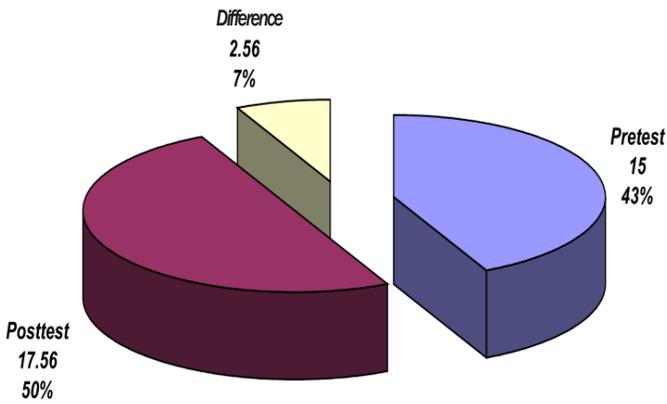


Figure 3. Percentage diagram of the average level of physical fitness for the treatment group B

Control Group Physical Fitness Level

The research conducted in the control group did not show a significant increase. This is evident from the minimal difference between the pretest (14.25) and posttest (14.63) average scores,

amounting to only 0.38. The difference between the pretest average score and the posttest average score can be represented as an increase, which is shown in the percentage diagram of the average level of physical fitness below.

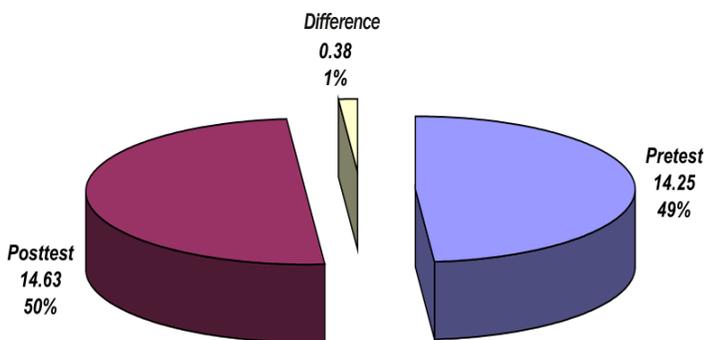


Figure 4. Percentage diagram of the average level of physical fitness for the control group

Average Increase in Physical Fitness

The implementation of the traditional sports treatment was carried out in 24 meetings, in each of the 6 meetings a test was carried out to find out whether the treatment had an

impact on increasing physical fitness. The average value of each of these tests can be seen in the graph of the average physical fitness test scores.

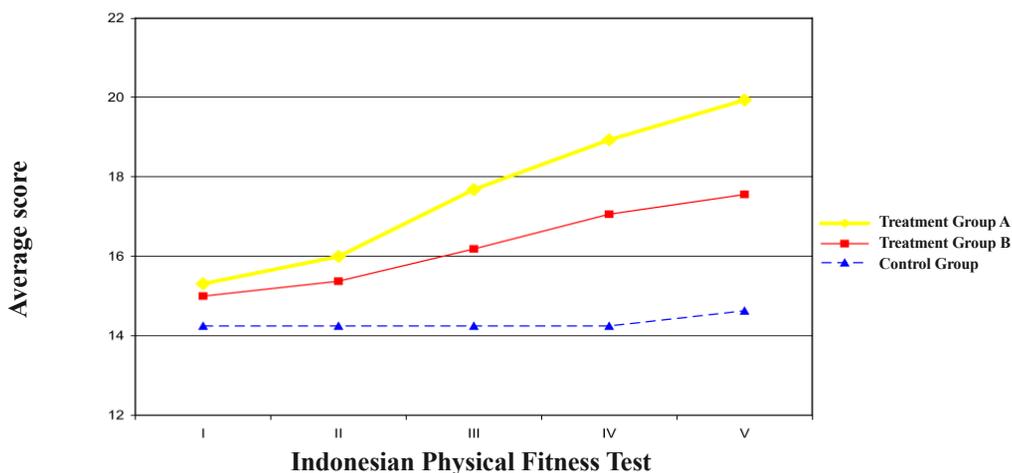


Figure 5. Graph of the Average Score of the Indonesian Physical Fitness Test

From the graphic image of the average Indonesian physical fitness test scores above, it can be seen that the scores for each test have increased, thus it can be concluded that treatment with traditional sports that is carried out continuously, planned and programmed can improve the physical fitness of early childhood. Something that is done in a planned manner, in this case planned training, can be beneficial to a person's quality of life [12]. The increase that occurred in treatment group A was more maximal compared to treatment group B and the control group, it can be seen in the value achieved in treatment group A which was higher.

Conclusion

After processing data and analyzing the effect of traditional sports on increasing physical fitness, it can be concluded that traditional sports are effective for improving physical fitness in early childhood. Traditional sports are basically movement activities in the form of fun games, which encourage students to be active and have more movement experiences [19]. According to previous research reports, traditional sports not only develop students' movement skills but can also be used to develop social skills, because they have values of discipline, responsibility, practice, honesty, tenacity, patience [20]. Traditional sports have extraordinary culture and value for developing students' abilities, including skills, manners,

activities, creativity, and exercises, as well as a means to develop students' abilities [21]. The frequency of practice 4 times a week is more effective for improving physical fitness compared to the frequency of exercise 3 times a week. The frequency of practice which is more in a week has a more significant impact on a certain skill or condition that you want to achieve [13]. It should be noted that in addition to increasing fitness, doing physical activity can improve and help overcome mental health in a person [22]. For example: reducing feelings of anxiety [23], helping stress recovery [24], increasing self-confidence and self-esteem [25]. It can be concluded that from a physical point of view, activity will provide good benefits for the body, especially for physical fitness [26], basic motor skills and motor coordination skills [27], brain and mental health [28], and the most important thing in this case is to improve academic achievement [29]. Besides that, discipline in carrying out physical activities really helps to achieve better physical fitness [30].

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