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The Effect of Physical Activity Programs and School Environments on Movement Activities and Mental Health

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Abstract The purpose of this study was to determine the effect of the physical activity program in the two groups of Physical Education and Physical Education + Out of School Hours Activity (OSHA) on movement activities and students' mental health based on the school environment where they studied. A total of 113 (57 students in a large school environment and 56 students in a narrow school environment) aged 16-19 years were involved in this study. Collecting data is to determine movement activities using the Barrow Motor Ability Test (BMT) and filling out a mental health questionnaire. The physical activity program was carried out for 12 weeks with a number of meetings once per week from each treatment group and for an additional Out of School Hours Activity program three times a week. The data were analyzed using the Kruskal Wallis test technique at a significance level of = 0.05. The results show that: 1) There is a difference in the effect of physical activity programs on Physical Education and Physical Education + OSHA on movement activities and mental health of students in a large school environment; 2) There are differences in the effect of physical activity programs on Physical Education and Physical Education + OSHA on movement activities and mental health of students in a narrow school environment. Thus, the physical activity program has an influence on movement activities and mental health even though in a large school environment, which is better than in a narrow school environment.

Keywords Physical Activity Program, School Environment, Movement Activity and Mental Health

1. Introduction

Physical activity is now a global program that is generally recognized as providing benefits for the well-being of individuals, families, communities and countries. Being active means that there are elements of the nervous and bone system working to produce body movements that release energy. Active, which is based on the global action plan by the World Health Organization (WHO) for physical activity launched in 2018-2030, authorizes countries to be present in providing policies and interventions that can help increase participation in physical activity [1]. Recent data have shown that one in four adults (1.4 billion people worldwide) does not meet the WHO recommendations regarding physical activity even though it provides the benefits of reducing the risk of chronic disease and improving their health and well-being [2].

Many findings prove that sufficient physical activity provides good benefits for the body, especially for basic physical activity [3], bone health such as mineral content and density in bones [4], brain and mental health [5]-[7]. Lack of physical activity will cause various kinds of problems, especially related to: cardiovascular disease [8], obesity [9], difficulty solving problems [10]-[11]. Physical activity programs of endurance and strength can increase the life satisfaction of obese children, and even increase satisfaction with aspects of school [12].

The 2015 Global School Health Survey data published Tuesday, May 15 2018 by the Ministry of Health of the Ministry of Health of the Republic of Indonesia said that adolescent students tend to adopt a sedentary life pattern, resulting in less physical activity (42.5%) [13]. Eating habits and physical activity are part of the behavioral component, both of which are influenced by environmental, socio-economic, and cultural factors [14]. Unfortunately today's teenage students spend more of their free time playing video-games, watching television and engaging in other sedentary activities. The low participation of the community, especially adolescent students in carrying out physical activities, is influenced by several variables that still need to be researched more deeply. Thus, one thing that needs to be done is to provide intervention in the form of a physical activity program to change this behavior.

There are programs that can be carried out to change the habits of adolescent students, for example programs based on school physical activities in the form of: extracurricular activities, sports units and sports classes [15]; organizational change and school physical environment [16]-[17], curriculum, school environment, and community [18]. Based on this opinion, it can be concluded that the school's physical activity program which includes learning physical education, regulations, extra and intra-curricular activities, sports units, school facilities, the role of teachers and principals as well as the use of rest time in the form of physical activity can improve movement activity, physical health and mental students. However, more findings are needed to support existing results.

Physical education can be an important source of physical activity, especially for female students to be able to influence participation in physical activity outside the classroom [19]. Physical education schools that exist for most adolescents are beneficial for participation in physical activity so that it can provide long-term health benefits [20]. Four years after the intervention with physical education the intervention group was still more physically active than the control group (2.7 (0.8 to 4.7) hours/week) and later (-3.9 (-9.7 to 1, 7) hours/week) [21]. While other findings say that Physical Education does not lead to an overall improvement in student fitness, including cardiovascular endurance, strength, and flexibility even reduces student attendance and discipline levels [22]. Consistent data are needed to support existing findings so that they can strengthen the influence of the physical education program in schools.

Physical education that has been set in the curriculum does not seem to have been sufficiently realized in the learning process caused by many factors, both internal to the school and from outside. Interventions outside school hours in the form of Out of School Hours Activity (OSHA) are needed, namely through low to high physical activity. Participating in organized physical activity in schools and in the community, students become more active and reduce sitting time between boys and girls thereby contributing to overall physical activity and helping their parents to be active [23]. With the program outside of study hours, students spend most of their rest time with physical activity [24]. Class-based physical activity outside of study hours can increase physical activity to high levels on a daily average, but large randomized controlled trials are needed [25]. There is no consistent data yet, which one is better between physical education programs or physical education + OSHA is something that needs to be supported by the latest findings. The purpose of this study was to compare four groups of students consisting of: group 1 students learning physical education in a wide environment, group 2 students learning physical education + OSHA in a large environment, group 3 students learning physical education in a narrow environment, group 3 students learning physical education in a narrow environment, group 3 4 students study physical education + OSHA in a narrow environment on movement activities and students' mental health.

The perceived environment affects adolescent physical activity, especially with regard to access/availability of resources, support from family and friends, physical activity with friends, physical activity with family members, inspiration from others; parental reinforcement, opportunities in daily routines, influence of social networks [26]. The environment is believed to be able to influence physical activity, especially those related to the living environment and roads that are often traveled [27], the school environment [28]-[29]. Environmental variables and physical activity and leisure time are helpful for developing location-based policies and interventions to encourage people to do more physical activity [30]. The environment can also inhibit physical activity for example resulting in sedentary behavior [31]-[32]. Students in school-wide settings report being more likely to participate in two or more physical education classes per week [33]. Meanwhile, another finding said that children in narrow school environments reported more physical activity after school, on holidays and weekends, and also the total amount of physical activity compared to those in large schools [34]. This means that more evidence is needed to support other findings about which school environment has the greatest influence on physical activity.

2. Methods

This type of research is an experiment where the

researcher conducts an experiment to examine an event that occurs under certain conditions, and every event that occurs is observed and controlled so that the cause and effect of the treatment can be determined. A total of 113 students were involved, consisting of 57 students who were divided into 2 locales consisting of 1 local physical education and 1 local physical education + OSHA) with a wide school environment and 56 students divided into 2 locales consisting of 1 local physical education and 1 local physical education + OSHA) with a narrow school environment. Based on previously published findings suggest that a minimum sample size of 20 children per intervention is required to detect cross-group changes in light to vigorous physical activity [34]. The physical activity program intervention lasted for 12 weeks with the number of meetings once per week from each treatment group and for the additional OSHA program three times a week (Tuesday, Thursday and Saturday). The duration of the intervention is at least 8 weeks or 2 months to determine the changes in each individual [17]. The instrument used to measure movement development is the Barrow Motor Ability Test (BMT) which includes standing board jump, softball throw, zig-zag run, wall pass, medicine ball-put, 60 meter run [35]. While the mental health instrument uses a questionnaire. The results of the validity test of the mental health questionnaire instrument (r count) were consulted with the critical price table from the r product moment table. For N = 30 with a significant level of 0.05 % is 0.374 [36]. Data were analyzed using Non-Parametric Statistical Test. The non-parametric test was conducted because the data were not normally distributed with a P-Value <0.05. To test the abnormal data, the researcher used the statistical analysis technique of the Kruskal Wallis test with the help of the IBM Statistical Package for the Social Science (SPSS) Statistics 23 [36].

Results

The results showed that the movement activity in the physical activity program group in physical education combined with OSHA in an open environment got the highest average score of movement development compared to the other groups, which was 2015,56, while those who obtained the lowest average score of movement activity were in the physical education group at narrow school environment that is equal to 1624.77. For more details can be seen in the table and figure 1.

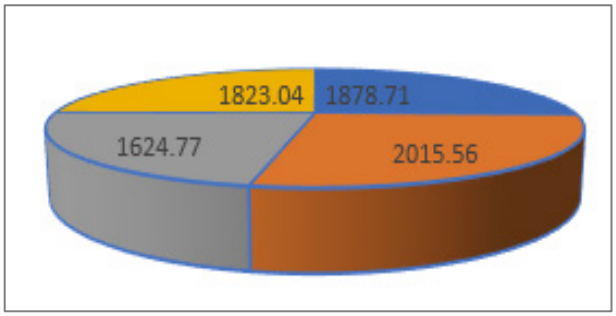

Figure 1. Overall Student Movement Activiti

From the results of statistical tests summarized in table 1 and figure 1, it is known that the students of the physical education + OSHA learning group in a large environment have the highest movement activity, the second rank is students who carry out physical education learning in a large environment, the third rank is students who carry out physical education + OSHA learning in a narrow environment, ranking four students who carry out physical education learning in a narrow environment. It can be concluded that students who carry out learning in a wide environment have higher movement activities than students who carry out learning in a narrow environment.

Table 1. Overall Student Movement Activities

		Physical Activity Program		
		physical education	**Physical Education + OSHA**	**Total**
School environment	Large	Movement Activiti n = 28 X̄ = 1878,71 sd = 505,84	Movement Activiti n = 29 X̄ = 2015,56 sd = 511,15	Movement Activiti N = 57 X̄ = 1948,33 sd = 508,69
	Narrow	Movement Activiti n = 29 X̄ = 1624,77 sd =458,43	Movement Activiti = 27 X̄ = 1823,04 sd = 459,91	Movement Activiti n = 56 X̄ = 1720,36 sd = 465,80
	Total	Movement Activiti tn = 57 X̄ = 1749,51 sd = 494,82	Movement Activiti = 56 X̄ = 1922,74 sd = 492,36	Movement Activiti n = 113 X̄ = 1835,36 sd = 499,04

Table 2. Overall Student Mental Health

		Physical Activity Program		
		Physical education	**Physical Education + OSHA**	**Total**
School environment	Large	Mental n = 28 X̄ = 86,32 sd = 5,26	Mental n = 29 X̄ = 91,14 sd = 4,65	Mental n = 57 X̄ = 88,77 sd = 5,48
	Narrow	Mental n = 29 X̄ = 75,38 sd =4,25	Mental n = 27 X̄ = 84,11 sd = 3,42	Mental n = 56 X̄ = 79,59 sd = 5,84
	Total	Mental n = 57 X̄ = 80,75 sd = 8,27	Mental n = 56 X̄ = 87,75 sd = 5,39	Mental n = 113 X̄ = 84,22 sd = 7,28

Next, the results of the analysis on mental health show the average acquisition of students' mental health as a whole. The highest mental average of students is in the physical education group combined with OSHA in an open environment of 91.14. While the lowest mental average of students is in the physical education group in a narrow environment of 75.38. For more details can be seen in the table and figure 2.

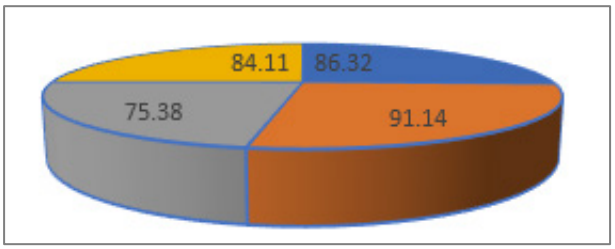

Figure 2. Overall Student Mental Health

From the results of statistical tests summarized in table 2 and figure 2, it is known that students of the physical education + OSHA learning group in a large environment have the highest mental health, the second rank is students who carry out physical education learning in a large environment, the third rank is students who carry out physical education learning + OSHA in a narrow environment, ranked four students who carry out physical education learning in a narrow environment. It can be found that students who study in a wide environment have a higher mentality than students who learn in a narrow environment.

The trial of the Kruskal Wall Test technique was carried out to determine there was no statistically significant difference between the groups, following are the results of hypothesis testing:

Table 3. Analysis of Physical Education-Based Physical Activity Programs with Physical Education + OSHA

Effect	Kruskal-Wallis	Sig.	Information
Movement Activiti	10,639	0,000	Signifikan
Mental health	25,633	0,000	Signifikan

The Kruskal-Wallis value obtained on the movement activity variable is 10.369 with a significance value of 0.000, and mental health is 25.633 with a sig value of 0.000, it can be seen that education-based physical activity programs are compared with physical education-based physical activity programs combined with OSHA together its effect on movement activities, and students' mental health.

To know whether there is a difference in effect between seeing the treatment groups, the fried food test is carried out following test results:

Table 4. Calculation Results of the Friedman Test for Movement Ability and Mental Health in a Wide and Narrow Environment.

Group	Asymp. Sig Large	Asymp. Sig Narrow	Information
Physical Education Program in a Wide Environment	0,000	0,000	Signifikan
Physical Education Program + OSHA in the Wide Environment	0,000	0,000	Signifikan
Physical Education Program in a Narrow Environment	0,000	0,000	Signifikan
Physical Education Program + OSHA in a Narrow Environment	0,000	0,000	Signifikan

The Friedman test results in the four groups showed a Sig value of 0.000 <0.05, so it was stated that there were differences in the effect of physical education programs in a wide and narrow environment, whether or not given additional OSHA on movement activities and mental health.

3. Discussion

The influence of physical activity programs for Physical Education and Physical Education + OSHA on students'

mental and physical activity in the wider school environment.

Based on the results that have been analyzed, it can be seen that the large school environment has a significant influence on both the physical activity program group based on Physical Education and Physical Education + Out of School Hours Activity (OSHA) on the movement and mental development of students. Based on these data, it is clear that the Physical Activity Program + OSHA has a very dominant influence, especially in the wider school environment. The broad school environment is here defined as the objective and perceptual characteristics of the physical context in which children spend their time (e.g., neighborhood, school) including aspects of urban design (e.g., presence and structure of sidewalks), traffic density and speed, distance to schools and the design of places for physical activity (eg, playgrounds, parks and school grounds), and safety conditions [39]. Physical education learning that is running in schools after receiving additional OSHA programs is proven to be able to increase students' physical activity marked by an increase in student movement and mental development. Physical activity programs can also be incorporated into the classroom through physically active academic lessons or during breaks [40]. Coordination between the school day either before or after school staff and administrators can help provide students with consistent levels of physical activity while they are at school.

Most schools do not offer the recommended 150 or 225 minutes of physical activity a week through physical education. Schools should be able to offer a variety of programs outside of physical education hours that provide additional opportunities for students to be physically active [41]. Because if the physical education program is added to a program outside of study hours, either in the morning before going to school or during breaks, it is believed to be able to increase students' physical activity, especially if it is supported by a large school environment. This is in line with the findings which say that a supportive school environment can motivate pre-adolescent children to be more physically active so that they are healthier, the data reveal that a large school yard and rich in outdoor facilities can cause students to be more physically active during recess [42]. Thus the school's physical activity program and supported by a broad school environment will be very effective in increasing students' physical activity.

The effect of physical activity programs for Physical Education and Physical Education + OSHA on the development of movement and mental health of students in a narrow school environment.

In a narrow school environment, although it has obstacles in terms of access to facilities for sports that are inadequate or only adequate, it still has an impact on the development of movement and mental health of students between groups of physical activity programs, both in the regular Physical Education group and in the Physical Education group + OSHA. A good school environment is a school environment that can support learning processes and goals. Promotion and place of school-based physical activity have a big role to increase physical activity in students but to maximize these efforts school policies related to training on physical activity are needed [43]. Physical activity programs in a narrow school environment have an impact on student behavior during the intervention. Thus this program can increase physical activity and have an effect on better student behavior, especially mental health, physical and movement development. Various physical and mental health benefits can be obtained when children participate in the recommended moderate to vigorous intensity physical activity of 60 minutes per day [44]-[45]. This finding supports previous relevant research and suggests that students need a lot of space to engage in PA during recess [46]-[48]. Thus, the narrow school environment after being studied based on this research, although it has an influence, is relatively lower than the wide school environment. It takes intervention in learning in a narrow school environment to improve students' mental health [49]. Based on gender, it proves that the mental health of urban male students is better than that of rural students, while the mental health of urban female students is lower than that of rural students [50]-[53].

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