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<https://ejournal.upi.edu/index.php/penjas/article/view/24518>DOI: <https://doi.org/10.17509/jpjo.v5i2.24518>**The Effect of Educative Games on the Physical Fitness of Kindergarten Children****Asep Deni Gustiana^{1*}, Ryan Dwi Puspita²**¹Fakultas Ilmu Pendidikan, Prodi PGPAUD, Universitas Pendidikan Indonesia²Fakultas Ilmu Keguruan dan Pendidikan, Prodi PGSD, IKIP Siliwangi**Article Info***Article History :**Received Mei 2020**Revised April 2020**Accepted July 2020**Available online September 2020**Keywords :**educative games, kindergarten children, physical fitness***Abstract**

The purpose of this research was to test the effect of educative games on children's physical fitness in Kindergarten. This research was conducted based on the empirical findings that show that the number of children in Kindergarten experienced excessive fatigue after doing activities. Besides the children body mass index, many indicators are included in the category of obesity. The one that causes the phenomenon is the low physical fitness of the children. The problem demands a learning approach or method to handle it without causing excessive fatigue on children. This research was conducted by using the quasi experimental method. The subjects in this study were 30 Kindergarten children in Sukasari Sub-district, Bandung. The results showed $p < 0.05$ which means that there was a significant difference in physical fitness between the control class and the experimental class in post-test with an average score 3.26 for control group, and 6.67 for the experimental group. The results of validation and empirical data showed that learning educational game model gives a significant influence on the physical fitness of Kindergarten children. The learning process was also more enjoyable and engaging. Thus, learning with educative game methods can be considered as an alternative for learning to improve the children physical fitness. This research recommendation is addressed to Kindergarten teachers, Kindergarten school principals, and further researchers.

INTRODUCTION

Kindergarten is a place to stimulate aspects of child development in an optimal way. Kindergarten ages between 4-6 years and they have distinctive characteristics. 3-6 years of age is a sensitive period of children, in which a function needs to be stimulated, and directed, so that its development is not hindered (Hurlock, 1999). One of the development aspects that must be stimulated is the physic which includes maintaining physical fitness. High level of physical fitness is required by school age children including those in kindergarten. By possessing good physical fitness, the students will be able to carry out daily activities for a longer time span than the ones with low physical fitness.

Physical fitness plays important role for school-age children in improving the function of body organs, social emotional, sportsmanship, and the spirit of competition. Some studies even state that physical fitness has a positive correlation with academic achievement (Simon, 2006). In addition, the level of physical fitness is not only for maintaining a healthy body, but also for healing an unhealthy one (Cooper et al., 1983). The physical fitness test used is by adapting the PREFIT battery test (Cadenas-Sanchez et al., 2019). The test is used for children aged 3-5 years, so it is in accordance with the research subject. This test is to find out how much oxygen (O₂) a child takes when doing sports or physical activity. The maximum ability of a person to take O₂ in the air for a certain time is called VO₂max. Those who have high VO₂max are people who possess a good physical fitness level, while those who have low VO₂max are people with low levels of physical fitness (Simon, 2006).

In fact, the number of kindergarten children with low level of physical fitness is still high. The indications are obesity, excessive fatigue, and frequent absences from school due to illness. This problem can be eliminated if the children have a good level of physical fitness (Zhou et al., 2014). The children in kindergarten are very happy with play and games, and so learning in kindergarten should be conducted through play and games (Musthafa, 2008). In improving physical fitness, educational games are suitable to implement. The function of play for children is the core of the learning process. Through playing, children can build understanding and knowledge. With positive playing activities, chil-

dren can train their brain and encourage motoric development like practice to use their body muscles and stimulate their senses. Playing encourages children to explore the world around them, recognize the environment where they live, and figure out anything about themselves. Thus, the physical abilities of children are increasingly trained, as well as their cognitive abilities and social abilities.

Every child can develop their emotional skills, trust, independence, and courage to take initiatives. Playing trains the skills needed by children to become competent individuals and make them aware of their abilities and strengths (Gustiana, 2014). Educative games are created from the results of creativity that contain elements of education. Educative games to be performed are a helpful friend and probity paper.

In line with the increasingly intense exploration of the meaning of human life, many experts have begun to grow a strong urge to seek human development by using research approach and knowledge-based perspectives (based on knowledge) that they pursue. One of the scientific fields that consistently explore the existence of human development is psychology. There emerge several psychological figures who try to explain play and games from their own point of view.

Educative games are like any other games, only with the addition of educational elements. Educative games are very fun to play and can become an educational method or tool. They are carried out for the purpose of getting fun and satisfaction from the educational method or tool used in the activities. This is related to physical fitness. Some experts suggest that educative games can improve psychomotor abilities yet to be balanced with the development of cognitive skills (Den Duyn, 1997; Rink, 2010; Stolz & Pill, 2014). Teaching sports in physical education is considered traditional but capable of developing children's psychomotor abilities (Kirk, 2009; Metzler, 2011).

As the psychomotor abilities of children develop, physical fitness will also develop. Physical fitness is a basic requirement in carrying out activities for everyday life. A fit person means he is dynamically healthy. Dynamic health will support a variety of physical and psychological activities. A person's fitness will have a positive influence on performance and will also provide

positive support on work or study. Physical fitness related to health is needed by school-aged children including kindergarten to maintain healthy body, overcome environmental stress, and carry out daily activities, especially learning and playing.

Physical fitness is considered a strong marker of young children and adolescents. For example, children with low level of physical fitness have a higher risk of suffering from cardiovascular disease, being overweight/ obese, and mental disorders (Ruiz et al., 2009). The other researchers, Ortega et al. (2008; Cadenas-Sanchez et al., 2016), analyzed a sample of more than 1,000,000 Swedish adolescents showing that those with low physical fitness were more likely to experience impaired morality in life (Ortega et al., 2012). Likewise in a recent systematic review, the association between physical fitness and health indicators among children-adolescents has been examined, including the preschool age of 5 years old (Lang et al., 2018), since from some studies, it was revealed to be at preschool age ($n = 5$, 3.5%). This suggests a significant relationship between cardiorespiratory fitness and health indicators, such as in studies conducted on adolescents, cross-sectoral and longitudinal education shows that preschoolers around 5 years old with higher physical fitness level tend to be at a lower presented level. Martinez-Tellez et al. (2016) observe that not only cardiorespiratory fitness but muscle strength, speed-agility, total balance, and body fat centers are also correlated mutually in children aged 3-5 years. This makes the basis that there is a need to include physical fitness in early childhood learning, especially in kindergarten through educational games.

METHODS

The research method used was quasi experimental method. Researchers used the Nonequivalent Groups Pretest-Posttest Design (Cohen et al., 2018). The study administered the design because it trained the condition of the research subjects which were the kindergarten children. The characteristics of kindergarten children were that they did not want to be separated from their classmates, so that the researcher immediately assigned the experimental group and the control group without random.

Population dan Sample

The population of this study were all kindergarten children of 5-6 years old in Bandung. The research was conducted in two kindergartens located in Sukasari District, Bandung using cluster random sampling (Cohen et al., 2018). The research subjects were 30 children in upper kindergarten level (B group), namely the age of 5-6 years.

Research Instrument

Tests were conducted in this study as the data collection technique while the instrument used was a modified PREFIT battery test. The PREFIT test component consisted of cardiorespiratory fitness, upper-limb muscular strength, lower-limb muscular strength, speed-agility and balance test (Cadenas-Sanchez et al., 2016). Researchers only used two components of the physical fitness test, namely cardiorespiratory fitness (20m roundtrip run) examining the heart's ability to take in oxygen and lower-limb muscular strength (standing broad jump without prefix) for testing leg muscle strength. Researchers made a modification to the 20 m roundtrip test (shuttle run) for five minutes. Thus the children did not get bored easily during the five minute activity by assigning them to collect as many balls as possible along the trip.

Data Analysis

The data from cardiorespiratory and lower-limb muscular strength test were processed using the SPSS 21 application to test the difference in influence between the experimental and control groups. The test would employ the t-test if the data was normal and homogeneous and the U-test if the data was abnormal and homogeneous (Bluman, 2012).

RESULT

The results of this study indicated that the pretest data (cardiorespiratory and standing broad jump) of the experimental and control groups was normally distributed due to the sig. $0.200 > 0.05$, and homogeneous. Then the next step was to do the t-test for the data from cardiorespiratory and standing broad jump test of both the control and experimental groups at the time of the pretest. The results of the t-test of the pretest data for the two components of physical fitness were presented

in tables 1 and 2 below.

Table 1. The Cardiorespiratory Difference Test Results of the Kindergartens Children at Pre-test

Mean	SD	t	df	Sig.(2-tailed)
18.47	3.6	-.102	28	.920
18.6	3.5	-.102	27.9	.920

Table 1 showed the sig. $.920 > 0.05$ so H_0 was accepted, meaning that there was no significant difference in the cardiorespiratory rate between the control and experimental groups at the time of the pretest.

Table 2. The Standing Broad Jump Difference Test Results of the Kindergartens Children at Pre-test

Mean	SD	t	df	Sig.(2-tailed)
99.33	6.5	.227	28	.784
98.67	6.	.227	27.9	.784

Table 2 revealed the sig. $.784 > 0.05$, so H_0 is accepted, meaning that there was no significant difference in the Standing Broad jump of kindergarten children between the control and experimental groups at the time of the pretest.

As for the post-test data, after the normality test was carried out, it was found that it was normally distributed with a sig. $0.200 > 0.005$ value and the data was homogeneous. Furthermore, the t-test was employed to the post-test data to see the effect of the treatment given between the control and experimental groups on the physical fitness of kindergarten children. The results of the t-test for the post-test data of the two components of physical fitness were shown in tables 3 and 4 as follow.

Table 3. The Cardiorespiratory Difference Test Results of the Kindergartens Children at Post-test

Mean	SD	t	df	Sig.(2-tailed)
29.13	3.6	3.071	28	.005
24.8	4.1	3.071	27.4	.005

Table 3 showed that the sig. $0.005 < 0.05$, so that H_0 was rejected, meaning that there was a significant difference between the control and experimental groups of children at the time of post-test.

Table 4. The Standing Broad Jump Difference Test Results of the Kindergartens Children at Post-test of the

Mean	SD	t	df	Sig.(2-tailed)
115.13	6.5	5.72	28	.000
102.40	5.6	5.72	27.4	.000

Table 4 presented the sig. $0.005 < 0.05$, then H_0 was rejected, meaning that there was a significant difference between the control and experimental groups of children at the time of post-test.

DISCUSSION

Games have a positive impact on children development in various dimensions including cognitive, affective, social, and physical. In line with the statement, it is appropriate for kindergarten teachers to carry out learning by the help of educational play tools in the hope that children are more active and the learning be effective in order to gain more experience on physical movement and increase multiple intelligence. Children with motoric learning difficulties, ages 5 to 8 years old, are found to have lower scores on cardiovascular endurance, flexibility, abdominal strength, speed and strength (Rivilis et al., 2011; Sigmundsson & Haga, 2016). Physical fitness is related to health in children. This has generated considerable attention and interest among public health professionals, researchers, and parents. However, a little research has examined the physical fitness of preschoolers.

In america physical activity interventions designed for children have reflected two views: activities should enhance physical fitness as well as promote social, emotional, and intellectual development. The results show that physical exercises foster children's mental function, especially executive function where physical activity affects complex mental functioning and is probably moderated by several variables, including the level of physical fitness, health status, and psycho-social factors. Physical activity interventions for children should be designed to meet multiple objectives such as optimizing physical fitness, promoting health-related behaviors that redress obesity, and facilitating mental development (Tompsonowski et al., 2011). Physical health is indicated by various factors including body weight,

cardiorespiratory fitness, musculoskeletal fitness (muscle strength and endurance) and support and is associated with health outcomes and / or health markers in youth (Cattuzzo et al., 2016). Children's physical fitness is also influenced by the quality of the physical education curriculum application, especially in the physical development and physical fitness of children. Starc & Strel (2012) show that the interventions proofing school intervention can function if they are properly implemented and delivered.

In this study, educative games refer to the activities to develop children's physical fitness. This educational game was a very fun activity that can be an educational tool. Educative games can also be defined as a form of activity to get pleasure or satisfaction from the methods or educational tools used.

The educative games used in this study were helpful friend and honesty paper whose activities stimulate the work of heart and lungs in order to develop the lung capacity and strengthen the heart muscle. The implication is that it will increase VO₂max and is directly proportional to physical fitness (Cooper et al., 1983; Metzler, 2011). Thus, educative games are one of learning methods that can have a significant effect on the physical fitness of kindergarten children. In addition, educational play tools can reduce the level of boredom of the children because there are elements of cooperation, competition, creativity, and stimulate the children's movement skills. Therefore, the educative play tools can be used as an alternative in improving children's physical fitness.

CONCLUSION

Educative games can improve the physical fitness of kindergarten children because by playing they will feel happy and grow the eagerness to move. Being active, they are automatically practicing sports which will have an effect on physical fitness. Educative games can be used as an alternative method in the learning process. Moreover, the kindergarten curriculum that implements an integrated thematic is very relevant when educative games are applied, because in addition to improving physical fitness it can also stimulate other aspects of children's development such as cognitive, social-emotional, language, art, and of course physical-

motoric.

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