International Journal of Psychosocial Rehabilitation, Vol.24, Issue 01, 2020
ISSN: 1475-7192

THE EFFECT OF OBESITY ON CHILDREN FITNESS IN THE AGE 10-12 YEARS OLD

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ABSTRACT

Purpose : The purpose of this study was to determine the differences in fitness among 10-12 year old students with normal body mass index and obesity. **Methods :** This study was quantitative descriptive, which to determine the differences in fitness among 10-12 year old students especially in cardiorespiratory fitness. Cardiorespiratory fitness was measured by indirect methode use prediction formula for Volume Oxygen Maximum (VO_2max). Normality test uses *Shapiro wilk test.* The sample consisted of 30 students which divided in to two groups, first group consisted of 15 student with normal body mass index and another group consisted of 15 student with obesity. **Result :** Normality test was tested by *Shapiro Wilk Test* showed that the data is distributed abnormal with the result p=0,012 (p<0,05). Hypothese test uses *Mann-whitney U test* showed that there was difference in fitness among 10-12 year old students with normal body mass index and obesity which the value p=0,000 (p<0,05). **Conclusion :** This study showed that there was difference in fitness among 10-12 year old students with normal body mass index and obesity.

Keywords **:** *Obesity, Fitness, VO_2max.*

PRELIMINARY

The existence of a cultural shift from a motion culture to a stationary culture causes problems in the aspect of physical fitness. This is caused by the impact of increasingly sophisticated technology. Children prefer silence while playing gadgets or silence while watching television so that children tend to eliminate physical activity in various activities. This is the thing that can cause low physical fitness to affect the child's physical growth and development.

Obesity is simply defined as a state of excessive accumulation of body fat. Obesity occurs because of an imbalance between energy intake and energy output resulting in excess energy which is then stored in fat tissue. The excess energy can be caused by excessive food consumption, while low energy output is caused by low body metabolism, physical activity and food thermogenesis.

Rauner et al., 2013 defines obesity as an abnormal amount of fat that can affect health and can increase body weight (exceeding the normal amount measured) due to high fat consumption.

Obesity is characterized as a chronic level of inflammation in adipose tissue, liver and skeletal muscles (Glass and Olefsky, 2012; Shu et al., 2012 in Lee et al., 2014). This inflammation takes place during the occurrence of obesity which can cause systemic insulin resistance, hyperinsulinemia, and glucose intolerance (Lee et al., 2011 in Lee et al., 2014), recent studies suggest that this can cause adipose tissue dysfunction in obesity (Hosogai et al., in Lee et al., 2014).

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Obese children, tend to be lazy to move and prefer activities that do not require a lot of energy so they are not easily tired. So that obese children will tend to have a sedentary lifestyle that is a lifestyle that does not move a lot, some time is spent sitting by without physical activity. Because of low physical activity, obese children will tend to have low physical fitness, which is seen when doing physical obesity activities will easily feel tired compared to normal children their age. Though physical fitness in children is very useful to support the physical work capacity of children which in the end is expected to improve their performance. Good cardiovascular endurance will improve the ability of children to work.

Someone said to be fit if they are able to do physical activity without experiencing excessive fatigue and still have the energy to do recreational activities (Hoeger and Hoeger, 2011). Fitness is related to health when physical activity can be carried out without excessive fatigue, maintained for a lifetime and as a consequence has a lower risk for early chronic disease. A person who is physically fit can carry out daily physical activities diligently, has a low risk of health problems and can enjoy sports and various other activities.

Fitness is divided into physical fitness related to skills (including speed, muscular power, dexterity, balance and coordination) and physical fitness related to health (including muscular strength, muscular endurance, flexibility, cardiorespiratory endurance and body composition).

Cardiorespiratory fitness can be measured by determining the maximum capacity of oxygen volume that can be used when doing physical activity. Maximum O2 volume (VO2 max) is the maximum amount of Oxygen that can be processed and consumed by the human body during physical activity or intensive activities until fatigue occurs. Max VO2 is very important for physical performance and general health because during heavy work, a person's body needs 20 times the normal amount of oxygen. Someone with good stamina has a higher VO2 max value, can do heavier training, and has a higher concentration power (Noor et al., 2013). While low VO2 max values are at risk of causing cardiovascular disease. Cardiorespiratory fitness contributes greatly to one's health status (Hoeger and Hoeger, 2011).

In elementary school children aged 10-12 years or who are at level 4 to level 6, fitness is one of the factors that can affect the level of achievement in school. Physical fitness related to health ie cardiorespiratory endurance can be measured by determining the maximum capacity of oxygen volume that can be used when doing intense physical activity. Those who have good cardiorespiratory endurance can do more work or activities before they become tired compared to those who have poor cardiorespiratory fitness. So that children who are fit will look more active and more cheerful compared to children who are not fit. This will affect the child's enthusiasm for learning.

There are factors that can affect a person's cardiorespiration endurance, namely age, sex, body mass index or nutritional status and physical activity. One factor that affects cardiorespiratory endurance is nutritional status, people with a high body mass index ie those who have a body with a high percentage of fat tend to have low cardiorespiratory endurance.

Obese children tend to have low fitness which can affect their achievement, but not all obese children have low performance, fitness is only one factor that can determine the value of children's achievement. In addition, obese children and have low fitness have risk factors for cardiovascular disease. In order to avoid the risk of cardiovascular disease, it is necessary to know whether a person's fitness is low or not. The purpose of this study was to determine the differences in the fitness of elementary school children aged 10-12 years in the Normal BMI category and the obesity category.

In obese children most of the energy stored is in the form of fat and stored energy in the form of muscle which is less glycogen. Endurance of physical activity cannot be continued when energy storage in the body decreases. Fatigue during physical activity usually occurs when muscle glycogen is reduced. So to do activities that are long duration of obesity children are unable to do it.

RESEARCH METHODS

This study uses a cross sectional method where the measurement of the dependent variable (criteria) and the independent variable (predictor) are examined at the same time. The study was conducted at Tanjung Duren Utara Elementary School 01 Pagi in Tanjung Duren, West Jakarta. The population in this study were all grades 4 to 6 of Tanjung Duren Utara Elementary School one aged between 10-12 years. The sampling technique uses purposive sampling technique in order to get a sample that truly represents a group taken as a sample member. To determine the number of samples, this study refers to the research conducted by Esmaeilzadeh and Ebadollahzadeh in 2012 which were then calculated using the pocock formula and the results obtained were 15 people. The inclusion criteria are as follows; Students and students registered at the school are aged 10-12 years. For those who are obese, body mass

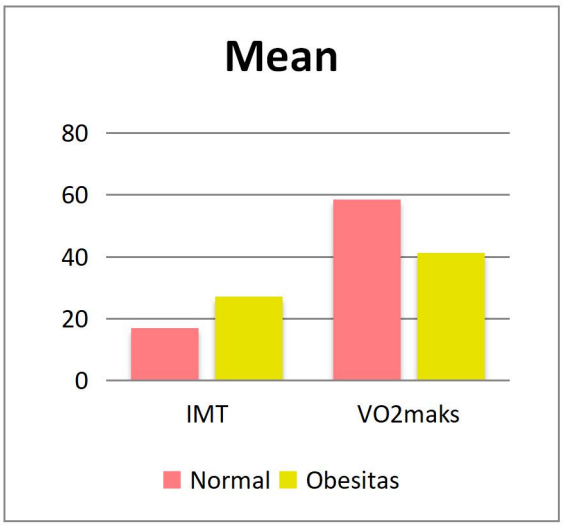
index based on age (BMI / U) has a threshold value> 2SD which is a BMI value> 21.4 for men and BMI value> 22.6 for women and are willing to be respondents in the study. While the exclusion criteria are as follows; Unwilling to be a respondent, experiencing illness one last week, suffering from musculoskleletal disability, suffering from heart disease. The independent variable in this study is obesity while the dependent variable is fitness. Obesity measurement data is obtained by calculating Body Mass Index based on age (BMI / U) whose categorization refers to Kepmenkes 2011. While fitness measurement data by calculating Maximum Oxygen Volume is measured using the One Mile Walking Test. The collected data is presented in the form of frequency distribution tables and cross tabulations then narrated by comparing with existing theories. To determine the effect of obesity on fitness by comparing fitness between the obesity group and the group with normal BMI.

RESULTS AND DISCUSSION

Data Description

Sampling is done by measuring body weight, height and body mass index according to age then taken samples that have normal and obese categories. Prospective samples fill out physical activity questionnaires that have been prepared by researchers to corroborate the inclusion and exclusion criteria data. Samples that meet the criteria are given an explanation by the researcher about the purpose, purpose and after that the researcher gives informed consent to be signed by the sample stating that the sample has understood the explanation given and the sample is willing to become a research sample.

In this study the samples obtained were 30 people. Divided into two groups namely the group with the category of normal BMI / U amounted to 15 people and the category of obesity amounted to 15 people. (27%) and 12-year-old samples were 1 person (6%). Whereas in the obese group the 10-year-old sample was 3 people (20%), the 11-year-old sample was 8 people (53%) and the 12-year-old sample was 4 people (27%). The distribution of samples by gender was obtained in the normal group of samples which had male sex amounted to 7 people (27%) and samples that had female sex amounted to 8 people (53%). Whereas in the obese group, there were 8 people (53%) who had male sex and 7 people (47%) who had a female sex. The distribution of samples was based on physical activity by filling in the physical activity questionnaire for children , obtained results for a sample of normal groups who have good physical activity, amounting to 8 people (53%) and samples that have less physical activity, amounting to 7 people (37%). While the obese group, there were 6 people who had good physical activity (40%) and 9 who had less physical activity (60%). Based on data from IMT / U measurements and VO2max measurements using 1-mile walking test, in the normal group with a total sample of 15 people the mean value for body mass index was 17.05 while the mean value for VO2max was 58.42. In the obese group with a sample of 15 people, the mean value for body mass index was 27.13 while the mean VO2max value was 41.26. The following is a graph of body mass index and VO2maks values of the two groups;



Grafik 1. Distribution of data based IMT and VO2 max

3. Hypothesis Testing

Normality test using the Saphiro Wilk Test found abnormal distribution of results. Furthermore, because the data are not normally distributed then the hypothesis test uses the Mann-Whitney U Test. By testing the hypothesis Ho is accepted if the p value> α value (0.05), while Ho is rejected if the p value <α value (0.05). The hypotheses that are upheld are:

Ho: There is no difference in the fitness of elementary school children aged 10-12 years in the Normal BMI category and the obesity category.

Ha: There are differences in the fitness of elementary school children aged 10-12 years in the Normal BMI category and the obesity category.

Hypothesis test results using the Mann-Whitney U Test obtained p = 0,000 where p <0.05, this means that Ho is rejected, so it can be concluded that there are differences in the fitness of elementary school children aged 10-12 years in the category of Normal BMI and obesity categories.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the study it can be concluded that there are differences in fitness of elementary school children aged 10-12 years in the category of Normal BMI and obesity categories.

The suggestions from the results of this study are;

1. To get more accurate results, when measuring VO2maks one researcher focuses on one sample so that the results will not be missed.
2. Samples are taught to count each pulse so that there is no queue build-up when calculating the pulse.
3. Further research is expected to pay attention to factors that influence obesity in children.

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