17.DMJ

by Erna Setiawati

Submission date: 26-May-2023 04:19PM (UTC+0700)
Submission ID: 2102338367
File name: 17._DMJ_Juli_20.pdf (359.13K)
Word count: 1921
Character count: 10372

DIPONEGORO MEDICAL JOURNAL
(Jurnal Kedokteran Diponegoro)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
Volume 9, Nomor 4, Juli 2020

EFFECT OF SENAM SEHAT ANAK INDONESIA IN MAXIMUM OXYGEN CONSUMPTION IN CHILDHOOD OBESITY

Gek Yun Arniari[1], Rahmi Isma AP[2], Erna Setiawat[2], Yetty Movieta Nency[3]
[1]Department of Medicine Diponegoro University
[2] Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Diponegoro University
[3] Department of Pediatrics, Faculty of Medicine, Diponegoro University

ABSTRACT

Background: Obesity is one of the causal factors of chronic diseases such as heart disease, diabetes, hypertension, asthma, arthritis, and cancer. The change in lifestyle and lack of physical activity in children increase the incidence of obesity, accompanied by a decrease in physical fitness. One of the parameters that can be used to determine the level of physical fitness is the maximum oxygen consumption (VO_2max). VO_2max in children can be increased through aerobic physical exercise, such as Senam Sehat Anak Indonesia (SSAI). SSAI combines aerobic movements and joyful music in order to motivate children to be more excited in gymnastics. **Methods:** An Experimental study with the pre-post test design among 23 samples who fulfill the inclusion and exclusion criteria. The exercises were administered twice a week for six weeks. VO_2max data were measured before and after the exercise in the first week and week 12. Data of VO_2max were analyzed using the data normality test with Shapiro-Wilk, then continued with Wilcoxon test to determine the difference of VO_2max. **Results:** There is significant difference of VO_2max between before and after SSAI ($p < 0.05$). **Conclusion:** There is an increase in the maximum oxygen volume (VO_2max) after the SSAI exercise in childhood obesity.

Keywords: Obesity, VO_2max, SSAI

INTRODUCTION

Obesity is a worldwide health problem that is increasingly found in many countries. The incidence rate of obesity is often increased among children, until now the number has continued to soar twice in children aged 2-5 years and aged 12-19, even tripled in children aged 6-11 years.[1] Based on the data of basic health study (RIKESDAS) 2013, the prevalence of obesity of 5-12 years children in Indonesia is still relatively high which is 8,8%.[2]

Obesity is one of the causes of chronic diseases such as heart disease, diabetes, hypertension, asthma, arthritis, and cancer.[3,4] Lifestyle changes and lack of physical activity lead to an increased incidence rate. Low physical activity can lead to a decrease in physical fitness.[5] One of the parameters that can be used to determine a person's fitness level is by measuring the maximum oxygen consumption (VO_2max).[6]

Studies conducted Juozas Raistenski et al. 2017 in childhood obesity measured VO_2max using a simple exercise test/sub-maximal of the six-minute walk test (6MWT) shows that obese children have physical fitness lower than children with normal body weight. It is proven that the lack of physical activity in a person will affect the decrease in the maximum oxygen absorption (VO_2max) as explained in the study Ratko Pavlović et al year 2017.[3,6]

Physical exercise is one of the activities that can increase oxygen consumption (VO_2max) to the maximum extent.[7] It shows that aerobic exercises can be one of the strategies to increase VO_2max in children. One of the aerobic exercises is

DIPONEGORO MEDICAL JOURNAL
(Jurnal Kedokteran Diponegoro)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
Volume 9, Nomor 4, Juli 2020

Senam Sehat Anak Indonesia (SSAI). This gymnastics combines aerobic movements accompanied by more joyful music so that children are expected to be more excited in gymnastics that aim to improve physical fitness.[8] As far as studyers know, there has been no study on the influence of SSAI against VO_2max in childhood obesity. This reason above becomes the basis of thought for the studyers to learn more about the role of this gymnastic on VO_2max.

METHODS

This study using the experimental design of *one group pre-posttest* design was performed using a purposive sampling method at elementary school. The inclusion criteria of this study are 8-12 years of obese children and the population consisted of 23 children. Informed consent was obtained in written form from the parents of each participating child The exclusion criteria of this study are those who have a medical history of respiratory disorders, cardiovascular disorders, and movement disorder.

The independent variable of this study is SSAI. The dependent variable of this study is the maximum oxygen volume value (VO_2max). The scaffolding variable of this study is gender and physical activity. The sample data is processed, the normality of data is analyzed by Shapiro-Wilk, then the test of difference is performed. If normally distributed data is tested using a paired T-test and abnormal distribution data is tested using a Wilcoxon test. When the value of p is less than 0.05 indicates that there is a meaningful difference between the two groups.

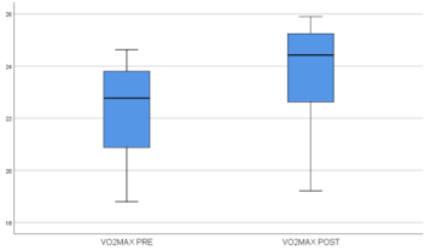
RESULTS

The normality test of data using the Shapiro-Wilk test obtained normal data distribution, then continued to the test of difference using the Wilcoxon test to determine the difference in the value before the exercise (pretest) and after the exercise (posttest) SSAI.

Table 1. VO2max before and after exercise

Before exercise (Mean ± SD)	After exercise (Mean ± SD)	p-value
22,26 ± 1,87	23,87 ± 1,76	**0,000***)

*) p-value is < 0.05



Picture 1. Boxplot Diagram VO_2max pretests and posttest values on each group

DISCUSSION

Based on the results of this study, the average test score obtained for obese children before doing the exercise (pretest) is lower compared to the average test score after the exercise (posttest). The average test score for obese children is 22.26 ± 1.87 before exercise (pretest) and is 23.87 ± 1.76 after exercise (posttest). The increase in this posttest score is statistically meaningful (p < 0,005). The results of this study following the hypothesis of studyers stating that there is an increase in volume value O_2 maximum (VO_2max) after the exercise of SSAI in childhood obesity.

DIPONEGORO MEDICAL JOURNAL
(Jurnal Kedokteran Diponegoro)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
Volume 9, Nomor 4, Juli 2020

According to the study by Juozas (2016) on physical activity and physical fitness in children with obesity, underweight, and normal weight. In this study, said that children with obesity that perform physical activity have better physical fitness than those who do not perform physical activity where one of the parameters to assess a person's fitness is maximum oxygen volume (VO_2max).[3] The children with obesity or overweight have a lower value, this is due to the excess body weight resulting from increased fat mass can weaken the performance of the cardiopulmonary system and the child's physical work of obesity.[9,10] Some studies have also shown that physical activity can improve the child's physical fitness obesity. According to some studies in obese people who have less physical activity tend to have a low value, but after the intervention of physical exercises and diet there is an increase in value although not too drastic, so it can be seen that physical activity can improve physical fitness.[24]

Based on a study by Wagner's PD (2010) states that physical activity or exercise can increase in value. The sport is endurance that includes certain durations, frequencies, and intensity. Improving the value and function of the heart can occur consistently when the exercise is performed regularly.[12]

One of these physical activities is SSAI which is categorized into the short term – light to moderate aerobic exercise where maximum oxygen consumption (VO2max) is between 30-49% for mild intensity and 50-74% for moderate intensity, with a training pattern using a type of rhythmic and continuous movement consisting of warming up, stretching, core, and cooling down. The rhythmic and continuous forms of gymnastics movement make this exercise can increase the need for oxygen by the muscles that are working through the increased diffusion capacity.[13] Also, to compensate the high levels of ATP consumption during physical activity short term – light to moderate aerobic exercise occurs increased blood distribution throughout the body,[13,14] This causes cardiac output (CO) increased as a result of stimulation of the sympathetic nerve that causes stroke volume and Heart rate (HR) to increase. It means that the oxygen distribution has also increased.[13,14]

Significantly, the difference between pretest and posttest can be said that SSAI can increase physical fitness, furthermore, it is a cheap physical activity because it does not require special equipment in exercise, and do not cause side effects, so SSAI can be a recommendation for physical training of school-age children, especially obese children who tend to rarely do physical activity.

CONCLUSIONS

Based on the results of this study can be concluded that there is an increase in VO_2max between before and after SSAI treatment. It is needed for involving control groups, thus the effects of the group given SSAI treatment and that is not administered by SSAI can be distinguished.

DAFTAR PUSTAKA

1. Nurrahman. Obesitas Di Kalangan Anak-Anak dan Dampaknya terhadap Penyakit Kardiovaskular. 2013.
2. Badan Penelitian dan Pengembangan Kesehatan RI. Riset Kesehatan Dasar. 2013.
3. Raistenskis J, Sidlauskiene A, Strukcinskiene B, Uğur Baysal S, Buckus R. Physical activity and physical fitness in obese, overweight,

DIPONEGORO MEDICAL JOURNAL
(Jurnal Kedokteran Diponegoro)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
Volume 9, Nomor 4, Juli 2020

and normal-weight children. Turkish Journal Of Medical Sciences [Internet]. 2016 [cited 2019 Feb 10];46. Available from: http://online.journals.tubitak.gov.tr/openDoiPdf.htm?mKodu=sag-1411-119

4. Donnelly JE, Jacobsen DJ, Whatley JE, Hill JO, Swift LL, Cherrington A, et al. Nutrition and Physical Activity Program to Attenuate Obesity and Promote Physical and Metabolic Fitness in Elementary School Children. Obesity Research. 1996 May;4(3):229–43.
5. Kulkarni S, Kanase V, Kanase N, Varute V, Joshi A. Assessment of Selected Physical Fitness Parameters in Malaysian Female Medical Students. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS). 2015;14.
6. Pavlović R, Vrcić M, Solaković S, Pupiš M, Radulović N. The Values Of Fitness Index And Vo2Max Of Students Using Indirect Method Aerobic Tests. Zenodo [Internet]. 2017 Oct 20 [cited 2019 Feb 10]; Available from: https://zenodo.org/record/1031979
7. Ltd. FT. Automated Fitness Level (VO2max) Estimation with Heart Rate and Speed Data. 2017.
8. Wonosobo S. DIKBUDPORA Perkenalkan Senam Sehat Anak Indonesia [Internet]. Seputar Wonosobo. 2016 [cited 2019 Feb 10]. Available from: https://wonosobokab.go.id/website/index.php/berita/seputar-wonosobo/item/4682-dikbudpora-perkenalkan-senam-sehat-anak-indonesia/4682-dikbudpora-perkenalkan-senam-sehat-anak-indonesia
9. Norman AC, Bart Drinkard, Jennifer R, McDuffie, Ghorbani S, Yanoff LB, et al. Influence of Excess Adiposity on Exercise Fitness and Performance in Overweight Children and Adolescents. 2005. P. 690–696
10. Anam M.S.,. Pengaruh Intervensi Diet dan Olah RagaTerhadap Indeks Massa Tubuh, Lemak Tubuh, dan Kesegaran Jasmani pada Anak Obes. Vol. 12. Sari Pedriatri; 2010. P. 36–41
11. Wagner PD. Limiting Factors of Exercise Performace. Dtsch Z Sportmed; 2010. P. 108–111
12. Periard JD. Cardiovascular Responses to Exercise. IOC Manual of Sports Cardiology; 2016. P. 32–42
13. Sutriono. Pengaruh Pemberian Air Minum Beroksigen Dibanding Dengan Air Minum Biasa Terhadap Nilai VO2max dan Tekanan Darah. 2014.
14. Sherwood L. Fisiologi Manusia Dari Sel ke Sistem Sherwood. 8th ed. EGC; 2014.

17.DMJ

ORIGINALITY REPORT

18%	14%	10%	10%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

2%

★ Submitted to Queensland University of Technology

Student Paper

Exclude quotes	Off	Exclude matches	Off
Exclude bibliography	Off		