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Effect of Six Minute Walk Test on Pulse Rate and Oxygen Saturation and Blood Pressure in Exercising and Non-Exercising in Young Adults.

Rekha D Kini¹, Anupama N^{1*}, Vishnu Sharma M², Nayanatara Arun Kumar¹, Bhagyalakshmi K¹, Sneha B Shetty¹, Ansuman Pattnaik³, and Elizabeth Josy Panikulam³.

¹Department of Physiology, Kasturba Medical College, Manipal University, Mangalore, Karnataka, India.

²Department of Respiratory Medicine, A J Institute of Medical Sciences, Mangalore, Karnataka, India.

³MBBS Student, Kasturba Medical College, Manipal university, Mangalore, Karnataka, India.

ABSTRACT

The present study was done to compare the pulse rate and oxygen saturation before and after six minute walk test between the exercising & non exercising young adult. This is a cross-sectional study conducted on total of 140 medical students of age group 17-25years of Kasturba Medical College, Mangalore. The standard informed consent is to be taken from all the subjects following approval from the college ethics committee. The 6-min walk test was conducted according to a standardized protocol. Blood Pressure of all the subjects is also recorded by auscultatory method before & within 5minutes after the six minute walk test. oxygen saturation, and pulse rate were assessed at the start and end of the 6-min walk test using Pulse Oximetry. Data was analyzed using student unpaired 't' test. $P \leq 0.05$ was considered as significant. In the present study the pulse rate of non-exercising students was higher compared to exercising group but there was no statistical significance. Systolic Pressure, Diastolic Pressure and Oxygen Saturation in non-exercising also did not show any significant difference compared with exercising group respectively. Thus it is concluded from the study that Oxygen desaturation during the six minute walk is not related to walk distance, nor does it determine the degree of perceived exertion.

Keywords: Blood Pressure, Pulse rate, Oxygen saturation. Pulse oximetry

**Corresponding author*

INTRODUCTION

In today's modern and technology aided lifestyle, the people are becoming more sedentary in their activities which affects their health adversely. Not only do they become more prone to diseases, but also they become accustomed to the easy way out which promises to bring more harm along with it. The best way to avoid such menacing problems is to do regular exercise. One of the best parameters to judge the body adaptation to exercise is measuring the pulse rate and Oxygen Saturation levels of blood[1].

Pulse oximetry is a noninvasive method that enables rapid measurement of the oxygen saturation of hemoglobin in arterial blood[2] and rapidly detect changes in oxygen saturation, thus providing an early warning of dangerous hypoxemia[3]. In apparently healthy adults, the red blood cells that pass through the lungs are between 95 and 100 percent saturated with oxygen. During exercise healthy individual show a decrease in oxygen saturation level. Subjects with higher level of Physical fitness are known to have greater degree of oxygen saturation during exercise. They have ability to deliver more oxygen to the exercising muscle compared to less fit adults[4].

Most studies investigating exercise induced hypoxaemia have used either cycle ergometry or treadmill walk tests. six minute walk is a more familiar form of exercise for patients and more relevant to their everyday life. There are studies reporting the effect of six minute walk test on oxygen desaturation in patient with air flow limitations[5]. There have been a limited number of studies examining the effects of regular exercise on oxygen saturation in healthy individuals. Hence the present study was chosen to compare the effect of six minute walk test on pulse rate, oxygen saturation and Rate pressure product between exercising & sedentary adults.

Aim and Objectives of The Study:

- To compare the pulse rate and oxygen saturation before and after six minute walk test between the exercising & non exercising young adult.
- To compare blood pressure between the exercising & non exercising young adult.

MATERIAL AND METHODS

This was a cross-sectional study. A total of 144 medical students of age group 17-25 years of Kasturba Medical College, Mangalore were included in the study. 72 subjects who were doing minimum 30 min of exercise per day for 3 days a week were taken as exercising (control) group and another 72 subjects who do not do any type of regular exercise were selected as non-exercising (case) group. A standard informed consent was taken from all the subjects following approval from the college ethics committee. Data was collected using questionnaire.

Six-Minute Walk Test: The 6-min walk test was conducted according to a standardized protocol¹. Subjects were instructed to walk from one end to the other of a 100-ft. hallway at their own pace, while attempting to cover as much ground as possible in the allotted 6 min. oxygen saturation (SaO₂), and pulse rate were assessed at the start and end of the 6-min walk test using Pulse Oximetry.

Pulse Oximetry: The procedure of Pulse oximetry to measure the pulse rate & oxygen saturation is explained to the subjects. Pulse rate & Arterial oxygen saturation is recorded from all the subjects before & after six minute walk test by fixing the instrument to the finger. Any discoloration of the nail bed can affect the transmission of light through the digit. Dark nail polish and bruising under the nail can severely limit the transmission of light and result in an artificially decreased SpO₂ value. So, subjects are instructed not put nail polish while recording the data. Blood Pressure of all the subjects is also recorded by auscultatory method before & within 5 minutes after the six minute walk test.

Inclusion Criteria: Healthy Medical students.

Exclusion criteria: Subjects with chronic illness, under long term medication, anemic and subjects with very dark skin.

Statistical analysis:

A statistical package SPSS Version 17.0 was used. The data was expressed as mean \pm SD. Student unpaired 't' test was used to do the analysis. $P \leq 0.05$ was considered as significant.

RESULTS

The pulse rate of non-exercising (115.44 ± 23.30) students was higher compared to exercising group (110.5 ± 18.55) but there was no statistical significance ($P < 0.1615$) (Table-1). Systolic Pressure ($P < 0.9624$), Diastolic Pressure ($P < 0.1725$) and Oxygen Saturation ($P < 0.1242$) in non-exercising (133.25 ± 19.07 , 73.58 ± 12.65 , 97.92 ± 1.12) also did not show any significant difference when compared with exercising group (133.42 ± 23.91 , 70.81 ± 11.57 , 98.14 ± 0.45) respectively (Table-1).

Table 1: Comparison of pulse rate, systolic blood pressure, diastolic blood pressure and oxygen saturation in exercising and non-exercising subjects after 6 minutes walk test.

Parameters	Exercising group (n=72)	Non-exercising group (n=72)	P value
Pulse Rate	110.5 \pm 18.55	115.44 \pm 23.30 ^{NS}	0.1615
Systolic Blood Pressure	133.42 \pm 23.91	133.25 \pm 19.07 ^{NS}	0.9624
Diastolic Blood Pressure	70.81 \pm 11.57	73.58 \pm 12.65 ^{NS}	0.1725
Oxygen Saturation	98.14 \pm 0.45	97.92 \pm 1.12 ^{NS}	0.1242

n- number of subjects in each group.

NS-not significant when exercising group compared with non-exercising group.

DISCUSSION

Pulse oximetry is used in many clinical and research settings as an indirect measurement of oxygen saturation. After severe and moderate exercise, oxygen saturation rose above the resting level, as has been found by Love (1955)[6]. But, results of the present study did not show any significant difference in oxygen saturation, systolic and diastolic pressure between non-exercising and exercising group after six minute walk test. Thus it is concluded from the study that Oxygen desaturation during the six minute walk is not related to walk distance, nor does it determine the degree of perceived exertion. Thus further studies are aimed to evaluate the deconditioning effect on cardio vascular system in the absence of exercise and make the people aware of exercise at young age itself

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