

PREVALENCE OF THE CARDIOVASCULAR FITNESS IN ACTIVE AND SEDENTARY SUBJECTS AGED 20-25 YEARS USING SIX MINUTE WALK TEST: AN OBSERVATIONAL STUDY

^{1*}Mayuri Anil Tijare, ²Ruchi Chandra

^{1*}V.S.P.M's College Of Physiotherapy, Nagpur. Email id: mayuri.tijare30@gmail.com

²V.S.P.M's College Of Physiotherapy, Nagpur.

Abstract

Cardiovascular fitness is the ability of the heart, blood cells and lungs to supply oxygen rich blood to the working muscle tissues and the ability of the muscles to use oxygen to produce energy for movement and is inextricably linked with health. Cardiovascular disease is a global health concern with high mortality rate. Poor Cardiovascular fitness is an independent risk factor for the mortality by cardiovascular disease in healthy men and women. Assessment of cardiovascular fitness can help prevent health declines in late life. In today's world, most of the young population lack physical activity because of the extensive use of gadgets. Six Minute Walk Test is one of the popular exercise tests used for assessment of the cardiovascular fitness. Hence the study was undertaken to find the prevalence of cardiovascular fitness in young active and sedentary subjects. 50 active, 50 sedentary males and 50 active, 50 sedentary female were included in the study. 6 Minute walk test was carried out in both the groups and pre-test, post-test vitals were recorded. The difference on the basis of the parameter 'Borg's score of Exertion' in the active and sedentary individuals, came out to be non-significant. The difference in the perception of exertion came non-significant.

Key Words: Cardiovascular fitness, six minute walk test

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INTRODUCTION

Physical fitness is “The ability to carry out daily tasks with vigor and alertness, without undue fatigue and with ample energy.”(1)

This energy is the result of various systems of our body working together.

Cardiovascular fitness is the ability of the heart, blood cells and lungs to supply oxygen rich blood to the working muscle tissues and the ability of the muscles to use oxygen to produce energy for movement and is inextricably linked with health.(2)

Poor Cardiovascular fitness results in endothelial dysfunction which explains the elevated cardiovascular disease risk.(3)

Poor Cardiovascular fitness is an independent risk factor for the mortality by cardiovascular disease in healthy men and women.(3)

Cardiovascular disease is a global health concern with high mortality rate and starts in childhood progressing to adulthood. (4,5)

The knowledge regarding this disease is very limited in young adults.

Cardiovascular fitness along with moderate to vigorous physical activity are modifiable risk factor preventing cardiovascular disease.

It can be assessed using a number of tests including treadmill tests, six minute walk tests, step up tests, cycling and rowing tests.(6)

In the present study six minute walk test will be used for assessing the cardiovascular fitness.

The six minute walk test is an exercise test used to measure the functional capacity.

It is one of the popular exercise tests used for assessment of the cardiovascular fitness.

The six minute walk test is a practical simple test that requires a 100 feet/ 30m hallway but no exercise equipments or advanced training for technicians.

It evaluates the global and integrated responses of all the systems involved during exercise.

The self- paced six- minute walk test assesses the sub - maximal level of functional capacity. The patients/ subjects choose their own intensity of exercise and are allowed to take bouts of rest during the test. The test is performed taking into consideration, the safety measures.(7)

In today's world where people spend most of the time on gadgets and automated devices, their lives lack physical activity.

Engaging in regular physical activity increases the cardiovascular fitness and reduces the mortality and morbidity. (4)

The modern world with advanced technology has its own drawbacks and there is a need to emphasize on it.

Young adults are the active group of the society and lack of adequate exercise is the most prevalent risk factor for cardiac diseases.(8)

Cardiovascular disease has a high mortality rate and hence is significant health concern globally. (4)

Evaluating and maintaining cardiovascular fitness can prevent declines in health in later life. (9)

Hence, the current study was planned to assess the cardiovascular fitness in active and sedentary groups.

The test is performed by asking the patient to walk which is why the test is very easy to administer and explain the subjects as walking is an activity performed by everybody.(7)

There are many studies done to determine the cardiovascular fitness in the diseased individuals and also to determine the same using Six Minute Walk Distance as the main outcome measure.(10)

There is only a little literature available on studies done on normal individuals using Borg's score of Exertion as the main parameter.

Hence, the current study was undertaken to assess the cardiovascular fitness in non-diseased young adults using Borg's score of Exertion as the main outcome measure

The aim of the study was to find the prevalence of the cardiovascular fitness in active

and sedentary subjects aged 20-25 years using six minute walk test. The objective of the study was to assess and compare the difference between the cardiovascular fitness in the active and sedentary subjects aged 20-25 years using the six minute walk test in terms of Borg's score of Exertion.

Methodology:

The research design was observational study. Study setting was VSPM's College Of Physiotherapy. Duration of study was 1 year for the study and 6 months for the collection of data. Sample size was determined considering difference in Borg's exertion score as the main outcome measure with the

following assumptions: Mean pre-test – post-test change after six minute walk test in active group = 6.1 ± 1.6 . Mean pre-test – post-test change after six minute walk test in sedentary group = 7 ± 2.2 . Mean difference (effect size) = 0.9 source: Priyanka Chugh et al 2015(1) A error = 5% (confidence interval = 95%). Power = 90% (β error = 10%). Ratio = 1:1. Required sample size : $n = 96$ per group. Therefore, 100 active and 100 sedentary subjects were included in the study. Method of sampling was Stratified random sampling (stratification factor : gender) All the subjects in the age group 20-25 years enrolled in the study setting constituted the sampling frame . From this sampling frame, 50 active - 50 sedentary males and 50 active - 50 sedentary females were selected. Each of the group of active and sedentary comprised of 50 males and 50 females. Inclusion criteria were: Age group of 20-25 years, active individuals who perform at least 20 minutes of vigorous exercise 3 or more times a week and sedentary individuals who do not perform any exercise, healthy asymptomatic individuals, subjects willing to take part in the study. Exclusion criteria were: Subjects having fever or common cold on the day of examination, subjects having heart rate < 50 beats/min or > 100 beats/min at rest and BP $> 140/90$ mmHg, the subjects must not be previously declared unfit for any type of exercise or physical activity. A countdown timer (or stopwatch), two cones to mark the turnaround points, a chair that can moved along the walking course and Sphygmomanometer were the materials required.

The eligible subjects started with the procedure. The test was performed along a long, flat, straight corridor with a hard surface, the walking course being 30m in length , that is a 100feet hallway. The turnaround points were marked with a cone. The subject was made to sit or rest in a chair located near the start line during which the contra – indications will be checked and the pre – test vitals will be collected. Proper instructions were given and the subjects made to walk along the pathway.

The walk of the subject was self – paced and the speed of the walk was not decided by anybody other than the subject himself. The subject was kept motivated through the six minutes using the standard phrases given in the guidelines provided by the AMERICAN THORACIC SOCIETY. The subjects were made aware of the time left further while they are walking. At the end of six minutes, the subjects were made to sit in a chair near to the end line and the post – test parameters were assessed.



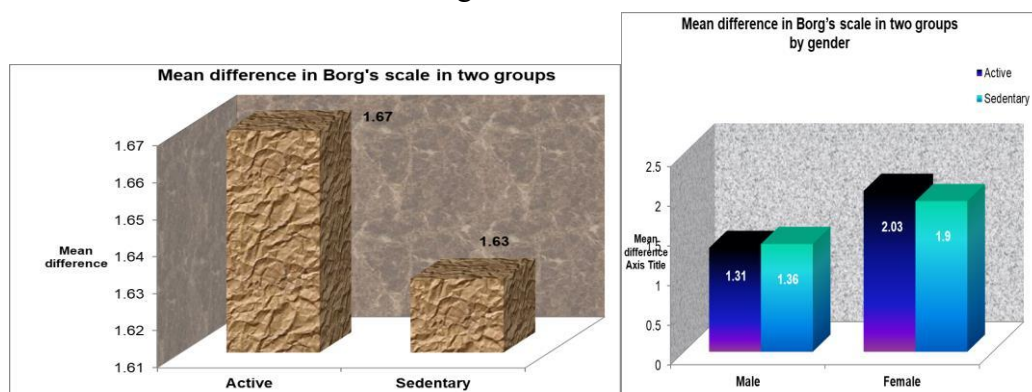
BORG'S SCALE

0	nothing at all
0.5	very very slight
1	very slight
2	slight
3	moderate
4	somewhat severe
5	severe
6	
7	very severe
8	
9	
10	very very severe

RESULTS:

Table : Distribution of subjects in two groups by gender				
Variable	Group			
	Active		Sedentary	
	Number	Percent	Number	Percent
Male	50	50	50	50
Female	50	50.00	50	50.00
Total	100	100	100	100

T-test was used to calculate the results which say that the mean of Borg's score of Exertion of active individuals is 1.67 ± 0.95 . The mean of Borg's score of Exertion of sedentary individuals is 1.63 ± 0.78 . The p value came out to be 0.74 which is non-significant. Two sample t-test is used to calculate the results which say that : In males , the mean of Borg's score of Exertion of active individuals is 1.31 ± 0.75 . The mean of Borg's score of Exertion of sedentary individuals is 1.36 ± 0.7 . The p value came out to be 0.73 which is non-significant. In females, the mean of Borg's score of Exertion of active individuals is 2.03 ± 1.0 . The mean of Borg's score of Exertion of sedentary individuals is 1.9 ± 0.7 . The p value came out to be 0.46 which is non-significant.



DISCUSSION:

The health related components of physical fitness are cardiorespiratory fitness, muscle strength and endurance. (11) In young adults, low muscle strength is a major risk factor for cardiovascular diseases. (11) Arterial stiffness is an early sign of cardiovascular diseases, this increases with ageing and associates with depressive symptoms in young adults. (3,11) In terms of HRQOL, association with fitness is

found in middle aged and young men and increased cardiovascular fitness leads to better HRQOL. (11) The study was done to observe the cardiovascular fitness in the active and sedentary individuals in the age group of 20-25 years. Cardiovascular effects of training include a decrease in resting heart rate and heart rate response to submaximal exertion; an increase in resting exercise stroke volume and an increase in maximal cardiac output.(12) Physical activity is a crucial factor in reducing the cardiovascular risks. (4) An acute bout of exercise can serve as a physiological challenge that reveals the impact of stress. (3) Therefore, this was done using Borg's score of Exertion as the parameter for comparison. Six Minute Walk Test is more relevant in terms of activities of daily living than other walking tests. (13) Six Minute Walk Test is validated in several asymptomatic individuals and chronic diseases. (13,14) The difference on the basis of the parameter 'Borg's score of Exertion' in the active and sedentary individuals, was non-significant.

Maximum values of cardiovascular fitness occur between ages 15 and 30 , decreasing progressively with age.(15) Lifestyle and structured interventions produced significant and comparable beneficial changes in physical activity, cardiorespiratory fitness, blood pressure.(16) The age group selected (20-25years) is itself an active group by nature, enough to maintain the cardiovascular fitness. It is proven ,that, behaviourally based lifestyle activities have a positive effect on the cardiovascular fitness.(16) Plus the basal metabolic rate is at peak in this age group.(17) So, the difference in the perception of exertion came non-significant. Based on the results of the present study, it was concluded that, as far as the Borg's score of Exertion is concerned, the difference in the cardiovascular fitness in the active and sedentary individuals in the age group of 20-25 years, was non-significant. Clinically it can be implied that cardiovascular fitness can be improved by activities involving larger muscle groups like walking, jogging, running, swimming, cycling, skating, etc. Such activities should be advised to be included in the schedule to maintain the health and fitness.

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