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A comparative study of selected physiological variables between active and sedentary college students

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Abstract

Aims and Objectives: The purpose of this study was to compare Selected Physiological Variables between active and sedentary male college students and therefore to show the importance of active lifestyle.

Material & Methods: The present study was carried out in 60 male college students between the age group of 18-22 yrs. They were divided into two groups, study group (30 active students) and (30 sedentary students). BMI was calculated with standard formula, cardiorespiratory fitness was measured by Coopers 12 min. run/walk test. The maximum oxygen uptake capacity (VO_2 max) was compared by using Queen' college step test (Harward step test).

Results: All the physiological variables were higher in active than sedentary college students.

Conclusion: The present study showed VO_2 max levels more in active college students. Now a days, physical inactivity is seen among students due to sedentary lifestyle which may lead to many health problems. Hence, we suggest that students should get involved in sports and it should make a compulsory subject in colleges.

Keywords: VO_2 Max, active and sedentary college students

1. Introduction

In this modern era, most of our youth are having sedentary life-style due to excessive exposure to television, computer, internet etc. Our students have physical inactivity due to stressful academics and busy schedule in schools, colleges, classes leading to poor health. In western countries, the people are more aware of health as compared to us. Regular exercise and sports is very important in young people in their busy life. Sports maintain physical as well as mental fitness and introduces values such as dedication, discipline and responsibility in us.

Aerobic capacity is an important element of success in sports' achievements. It is the maximum rate of oxygen consumption as measured during incremental exercise. It is also called as Maximum Oxygen Uptake/Maximum Oxygen Consumption/ VO_2 max. VO_2 max reflects physical fitness of an athletic individual. It is the best indicator of cardio-respiratory endurance and aerobic fitness. VO_2 max determines performance of an individual on the field of different sports. Along with VO_2 max, BMI and cardiorespiratory fitness are also important variables that can have their influence on the well being of the pupils.

The present study was initiated to estimate the BMI, Cardiorespiratory fitness and VO_2 max in active and sedentary male college students.

1.1 Aims and Objectives

1. To estimate the BMI, Cardiorespiratory fitness and VO_2 max in active and sedentary male college students.
2. To compare the BMI, Cardiorespiratory fitness and VO_2 max in active and sedentary male college students.

2. Material and Methods

The present observational study was carried out in 60 males college students form University of Kalyani. Out of the 60 subjects, 30 of them are regularly active in sports and rest of the 30 subjects of the same age having sedentary life-style were not doing any type of exercise. A detailed history was taken including Basic data such as Height, Weight are recorded and BMI was calculated by using formula.

$$BMI = Wt \text{ in Kg } / (Ht \text{ in m})^2$$

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Table 1: Demographic Characteristics of active and sedentary male college students

Variables	Active group (N ₁ = 30)		Sedentary group (N ₂ = 30)		Mean	SEDM	t-value
	Mean	SD	Mean	SD			
	Age (yrs)	18.0	0.79	17.70	0.70	0.30	0.19
Height (cm)	177.53	4.68	174.80	4.73	2.73	1.21	2.25*
Weight(kg)	71.53	5.97	73.10	5.12	1.57	1.44	1.09

Table 2: Comparison of Body Mass Index between Athletes and Non Athletes.

Variables	Athletes (N ₁ = 30)		Non-Athletes (N ₂ = 30)		Mean	t-value
	Mean	SD	Mean	SD		
	Body Mass Index	22.68	1.48	23.97	2.06	1.29
Body Fat Percentage	31.0	4.2	35.3	5.1	4.3	4.75*
Waist-hip ratio	0.91	0.03	0.93	0.03	.02	2.59*

*Significant at 0.05 level

2.1 Procedure

The VO₂ max was determined 3 hrs. after meal. The VO₂ max was determined by using Queen’s College Step Test. Prior to test, subjects were asked to warm up for 5-7 min (like brisk walking, stretching etc.) A wooden stepping bench of 16½inch was used along with metronome and stopwatch. Metronome was set at the rate of 24 steps per min. A brief demonstration was given. The subjects were asked to perform up and down stepping cycle for 3 min. After completion of test; pulse rate was measured for 15 sec. in standing position. This recovery pulse rate is converted to beats per minute.

3. Observations & Results

The mean VO₂ max(ml/kg/min) levels in active subjects was 55.30 ±2.78. The mean VO₂ max (ml/kg/min) in females with sedentary life style was 45.60 ± 3.48.

3.1 Statistical analysis of VO₂ max (ml/kg/min) between active and sedentary male college students

Groups	Mean VO ₂ max	t value	p value	Significance
	±S.D.(ml/kg/min)			
Active group (n=30)	55.30±2.78	16.01*	p<0.001	Significant
Sedentary group (n=30)	45.60± 3.48			

*Significant at 0.05 level

Table 3: Comparison of Cardiovascular Fitness by 12 min run / walk test of active and sedentary college students

Variables	Active group (N ₁ = 30)		Sedentary group (N ₂ = 30)		Mean	SEDM	t-value
	Mean	SD	Mean	SD			
	12 min. Run	1868.9	65.44	1820.2	38.63	48.7	0.46
Test (mtr)							

*Significant at 0.05 level

4. Discussion

In the present study cardiovascular fitness of the adolescent active and sedentary male students have been compared with each other. This study indicates the existence of cardiovascular fitness difference among the athletes and non-athletes. The demographic characteristics of athletes and non-athletes show that non-athletes were heavier as compared to

the athletes. The results of present study indicated that athletes had significantly greater fitness than non-athletes in terms of BMI, cardiorespiratory fitness and maximum oxygen uptake capacity. This is because of regular exercise which brings changes on the body. In a previous study significantly higher values of cardiopulmonary efficiency in active class were observed as compared to sedentary (Pakkala *et al.*, 2005) [9]. The findings of better cardiovascular fitness of athletes in the present study are in agreement with previous study conducted by Singh *et al.* (2012) [11], they suggested that athletes had better respiratory functions than non-athletes. Due to regular exercise, athletes tend to have an increase in respiratory capacity (Adegoke & Arogundade, 2002) [10]. It was indicated that regular physical activity has beneficial effects on the cardiovascular, respiratory and locomotor systems (Haskell & Kiernanm, 2000) [12]. Results of our study are found to be consistent with studies of Hermansen and Andersen (1965) [13] Amanda L. *et al.* (2011) [8]. They found significant increase in VO₂ max in trained group as compared to untrained group. Amanda L. *et al.* (2011) [8] reviewed VO₂ max and suggested active lifestyle for improving VO₂ max.

5. Conclusion

Regular physical exercise definitely improve cardio-respiratory fitness by increasing VO₂ max and decreasing body fat percentage leading to better quality of life. We recommend regular physical exercise in different forms of sports. German Philosopher Sorenson has rightly said “Build more playgrounds than hospitals.”

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