

A Study on Cardiovascular Fitness of Sedentary College Students of Khalsa College, Amritsar

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ABSTRACT

The aim of this research study was two-fold, first to determine the relationship between sedentary lifestyle of the college students and their cardiovascular fitness and second to compare the relationship between sedentary lifestyle of the college students and their cardiovascular fitness.

A total of 100 (50 male and 50 female) subjects from Khalsa College, Amritsar who met the inclusion criteria was taken. The parameters obtained were height, weight, BMI, pre-test heart rate, post-test heart rate and YMCA score. Result shows YMCA score obtained was at “very poor” level for all 100 % female subjects. In case of the male subjects, 8 % attained a score of “poor” whereas the remaining 92 % subjects attained a score of “very poor”. There is a significant sex difference in the YMCA score (t-value is 0.041, $p < 0.05$). The levels of fitness attained by the subjects of this study i.e. “poor” and “very poor” signify a negative impact on health. It is only when the youth of a society is in prime health, is the future secure and striving.

Key words: BMI, cardiovascular fitness, sedentary lifestyle. YMCA score

INTRODUCTION

Sedentary habits account for a substantial portion of death due to the coronary heart disease, type II diabetes and colon cancer. Physical inactivity has been named as an independent risk factor for CVD by the American Heart Association since 1992 (Dunn et al.1999). A sedentary lifestyle is one of the five major risk factors (along with high blood pressure, abnormal values for blood

lipids, smoking and obesity) for cardiovascular disease as outlined by the American Heart Association (Myers. 2003). In the 17th century occupational physician Beradini Ramzzini noted a relationship between sedentary behaviour and deleterious health consequences (Tremblay et al. 2010). As per an article published in 'Research Digest' by President's Council on Physical Fitness and Sports, it was mentioned that "Regular physical activity is associated with a reduction in all cause mortality, fatal and non fatal total cardiovascular diseases and coronary heart disease of cardiovascular diseases, cancer, chronic respiratory diseases and diabetes (Reiner et al. 2013).

During the last decade, physical inactivity has been associated with several factors such as TV viewing, driving a car, sitting which are strongly related to the risk of developing dyslipidemia, obesity, type II diabetes, hypertension, metabolic syndrome and cardiovascular disease. On average an adult is quite sedentary, spending more than or equal to 7.7 hours per day involved in activities resulting in very low energy expenditure (Warren et al. 2010). A recently published large international control study attributed 12.2% of myocardial infarction in the world's population to physical inactivity (Carnethon et al. 2005).

A large percentage of people in India are inactive with fewer than 10% engaging in recreational physical activity. The Indian population has 392 million inactive individuals. Majority of the individuals do not indulge in recreational activities and those that do, it is less than 20 minutes (Anjana et al. 2014). Transformation from a sedentary state to a more active lifestyle could pay a large dividend to the individual and society.

Cardiovascular fitness is the direct marker of physiological status and reflects the overall capacity of the cardiovascular system and respiratory system and the ability to carry out prolonged exertion (Taylor et al. 1995). Cardiovascular fitness of citizens of a country is a vital prerequisite to a country's realization of its full potential. An inverse relationship exists between physical activity and chronic heart disease (Francis. 1996). Two recent prospective studies in Britain showed that the incidence of CHD in physically active men of middle and old age is approx halved in comparison with incidence of CHD in sedentary men (Lamb et al. 1998).

Physical fitness is thought of as an integrated measure of most, if not all, the body functions (skeleton-muscular, cardio-respiratory, hemato-circulatory, psycho-neurological and endocrine

along with metabolic) involved in the performance of daily physical activity and/or physical exercise. Hence when physical fitness is tested, the functional status of all these systems is actually being checked. This is the reason why physical activity is nowadays considered one of the most important health markers, as well as predictors of morbidity and mortality for cardiovascular disease and for all cause mortality (Agarwal. 2012). The National Institutes of Health consensus development conference stated that: “The most active individuals have lower cardiovascular morbidity and mortality rates than do those who are least active; however, much of the benefit appears to be accounted for by comparing the least active individuals to those who are moderately active” (Williams. 2001).

In recent time there is a shift towards technology which has led to a sedentary lifestyle especially amongst the youth. The poor influence of sedentary lifestyle on vascular health begins early in life (McGavock et al. 2006). Although adolescents are not generally considered at risk for having clinical cardiovascular disease events in the short term, the development of risk factors during adolescents and young adulthood sets the stage to heart diseases in the middle and older ages (Carnethon et al. 2005).

Literature available to assess the fitness level amongst college students is scanty. Hence it is essential to study the level of cardiovascular fitness in sedentary college students therefore the present research is designed to study the relation between sedentary lifestyle and cardiovascular fitness which would help the college students in further understanding of their fitness levels. The self realization of their current fitness level will motivate them to participate in physical activity and move out of the realm of sedentary lifestyle.

MATERIALS AND METHODS

Participants: The present cross-sectional study was based on purposefully selected 100 students aged 18-25 years of Khalsa College, Amritsar. A written consent was obtained from the subjects. The subjects were recruited via convenient sampling method. Subjects with history of acute or chronic respiratory disorder, cardiovascular disorder, and neurological disorder are excluded from the study.

Procedure The subjects were measured for height and weight with an anthropometric rod and weighing scale respectively which was then used for the calculation of the body mass index. The

subjects who were within the normal range of body mass index were then subjected to measurement of pre-test heart rate. Following the recording of pre-test heart rate (pre-test heart rate was calculated via palpating the radial artery at the distal forearm and counting the beats/minute prior to administering the YMCA three minute step test.), the subjects were instructed to perform the three minute step test according to the YMCA guidelines (Golding, 2000). Immediately after completion of the three minute step test the subject was seated and the post-test heart rate of the subject was recorded for sixty seconds. The recorded post-test heart rate was then calculated according to the ‘three minute step test scoring’ an age adjusted standard based guidelines published by YMCA. The recorded parameters were then analyzed statistically.

Statistical Analysis

Standard descriptive statistics (mean \pm standard deviation) was determined for directly measured and derived variables. Data was analyzed using independent student t-test using SPSS (Statistical Package for Social Science) version 20.0. A 5% level of probability was used to indicate statistical significance.

RESULTS

Table 1 shows the calculated mean of pre-test and post test heart rate. The mean of pre-test heart rate for female subjects was 76.68 ± 11.42 beats/min and for males it was 69.64 ± 6.20 beats/min. The p-value is 0.000 ($p < 0.05$) showed a significant sex difference of pre-test heart rate. The post-test heart rate was 161.54 ± 14.07 beats/min in females as compared to 153.54 ± 17.62 beats/min in males. The p-value is 0.014 ($p < 0.05$) showing a significant sex difference in post-test heart rate.

Table 1: Mean and SD of pre-test and post-test heart rate

Heart Rate	Females		Males	
	Mean	SD	Mean	SD
Pre-test	76.68	11.42	69.64	6.21
Post-test	161.54	14.07	153.54	17.62

Table 2 shows the YMCA score obtained for female subjects was at “very poor” level for all 50 (100%) female subjects. In case of the male subjects, 8% subjects attained a score of “poor” whereas the remaining 92% subjects attained a score of “very poor”. The p-value is 0.041 ($p < 0.05$) showing a significant sex difference in the YMCA score.

Table 2: YMCA score attained by subjects in percentages

		Gender	
		Females (%)	Males (%)
YMCA Score	Poor	0	8
	Very Poor	100	92

DISCUSSION

It is a general belief that college going students are active in their daily life taking into consideration they attend classes and participate in extracurricular activity. However from the present study, by taking their history of daily activity into account, it has been observed that students fall into the sedentary lifestyle which is defined as less than 25 minutes of physical activity (any exercise of an intensity equal to or greater than walking at a fast pace) per day (Leon et al. 2007). The YMCA 3 minute step test score was also taken into account which categorized the students into the cardiovascular fitness level of “poor” and “very poor” based on their score obtained.

However if the childhood and young adulthood is marred with health problems, then the burden and consequences of such has to be carried by middle age and old age increasing morbidity and mortality. Studies have shown that poor fitness in young adulthood is associated with development of cardiovascular risk factors (Yuan et al. 2008). Recent research has also shown that low fitness in adolescents and adults is common and is associated with an increased prevalence of CVD risk factors (Carnethon et al. 2005). The risk is not contained to the fact that the poor cardiovascular fitness in childhood and young adulthood will lead to problem later on in life and not immediately. A research study conducted stated that sedentary lifestyle contributed to the acceleration of atherosclerosis in young adulthood (Berenson et al. 1998). So it is essential that cardio respiratory fitness must be taken into consideration and improved to prevent the onslaught of severe afflictions later on.

Physical therapists and clinicians should focus on the importance of physical activity as a measure to improve cardio respiratory fitness. Individuals who are physically fit regardless of their body composition lead a healthier and longer life as compared to individuals who are unfit. It is suggested by that it may be possible to reduce all cause death rates among older adults,

including those who are obese, by promoting regular physical activity, such as brisk walking for 30 minutes or more on most days of the week (about 8 kcal/kg per week) which will keep most individuals out of the low fitness category (Pate et al. 1995).

As per the results of this study, a suggestion maybe offered to make physical component integral part of college education so that it helps the students maintain their physical fitness. Similar suggestions have also been pushed by research studies that show low cardiovascular fitness levels in college students (Sinku. 2012). This research provides the students information in regards to their current status of physical fitness which in return can strengthen their will to improve their cardiovascular fitness by moving out of the grasps of a sedentary lifestyle. These results can also be of an aid to the physical education teachers and sports coaches to be more involved and strive to improve in assisting the students to become fit in terms of cardiovascular fitness.

CONCLUSION

The levels of fitness attained by the subjects of this study i.e. “poor” and “very poor” signify a negative impact on health. The subjects must take into consideration their current level of fitness and motivate themselves to be more active. The health professionals in relation to this must also bring the importance of being physically fit into limelight by emphasizing the requirement of regular physical activity as well as recommending it to individuals regardless of their current level of fitness. It is only when the youth of a society is in prime health, is the future secure and striving.

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