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Dr. Anju Luthra
Associate Professor, Physical
Education, Jesus & Mary
College, University of Delhi, New
Delhi, India

Relationship between selected measures of central adiposity and cardio-respiratory fitness

Dr. Anju Luthra

Abstract

The study was conducted to determine the relationship between selected measures of central adiposity and cardio-respiratory fitness. The study was conducted on 30 adult males in the age range of 35- 45 years. The variables selected as measure of central adiposity were sagittal abdominal diameter, waist girth and cardio-respiratory fitness (measured through 1 mile Rockport test). Product moment correlation (r) was employed to determine the relationship between selected measures of central adiposity and cardio-respiratory fitness. The results revealed an inverse significant correlation between sagittal abdominal diameter and waist girth with cardio-respiratory fitness as the coefficient of correlation obtained was -0.621 and -0.665 respectively at $p \leq 0.05$ level of significance. The result signifies that a higher sagittal abdominal diameter and a higher waist girth leads to a lower cardio-respiratory fitness which is an indicator for lower cardiac health and which may cause cardiac diseases.

Keywords: Sagittal abdominal diameter, waist girth and cardio-respiratory fitness

Introduction

Over the last 20 years, the global nature of many problems in health care has become much more evident. In the realm of health, this has meant that countries across the globe have started to experience the same kinds of behavioral shifts (overeating, reduced physical activity and smoking), and with them massive increases in cardiovascular risk factors.

This behavioral shift has brought a global epidemic- Obesity as a major issue all over the world. The obesity epidemic is actually a worldwide pandemic that has global implications for health and disease.

At present obesity has reached epidemic proportions globally, with more than 1 billion adults overweight - at least 300 million of them clinically obese - and is a major contributor to the global burden of chronic disease and disability.

Economic growth, modernization, urbanization and globalization of food markets are just some of the forces thought to underlie the epidemic. As incomes rise and populations become more urban, diets high in complex carbohydrates give way to more varied diets with a higher proportion of fats, saturated fats and sugars. At the same time, large shifts towards less physically demanding work have been observed worldwide. Moves towards less physical activity are also found in the increasing use of automated transport, technology in the home, and more passive leisure pursuits.

Obesity has also reached epidemic proportions in India in the 21st century, affecting 5% of the country's population. India is also following a trend of other developing countries that are steadily becoming more obese. Unhealthy, processed food has become much more accessible following India's continued integration in global food markets. Indians are genetically susceptible to weight accumulation especially around the waist.

According to a survey around two to three lakh people in Delhi suffer from morbid obesity, which does not respond to the usual means of weight loss like controlled diets and exercise programme. In our study we have selected Central adiposity as one of our variable because central adiposity—where fatness is heavily concentrated around the waistline—is a better measure of disease risk than overall or total adiposity. However, it is difficult to assess which is the better measure of disease risk when total adiposity and central adiposity are so highly correlated (Kuller 1999; Obarzanek 1999).

Correspondence

Dr. Anju Luthra
Associate Professor, Physical
Education, Jesus & Mary
College, University of Delhi, New
Delhi, India

Certain abdominal skin fold measures, waist-to-hip ratio (WHR) and waist circumference are considered to be markers of central adiposity or intra-abdominal fat. Similar to BMI, health risks increase as waist circumference increases. Waist circumferences greater than 102 cm (men) and 88 cm (women) indicate substantially increased risk. Anthropometric measures have served as noninvasive markers because obesity, particularly abdominal obesity, is closely associated with cardiovascular risks factors. Therefore, in our study we had chosen various anthropometric measures assessment with cardio-respiratory fitness. The primary objective of the study was to find the relationship between sagittal abdominal diameter and waist girth with cardio-respiratory fitness.

Procedure and methodology

The study was conducted on 30 adult males in the age range of 35- 45 years. The subjects were selected from West Delhi (Punjabi Bagh). Prior consent was taken from the subjects. It was ensured from the medical examination records of the subject that all of them were medically fit for undergoing the cardio-respiratory fitness test. The variables selected as measure of central adiposity were sagittal abdominal diameter (measured by assessing the thickness of the abdomen at the waist level to the nearest centimeter, with the help of a portable abdominal caliper while the subject is in supine lying position on the examination table) and waist girth (was taken at the Umbilicus (belly button) to the nearest centimeter with the help of a steel tape) while cardio-respiratory fitness was measured through 1 mile Rockport test. Product moment correlation (r) was employed to determine the relationship between selected measures of central adiposity and cardio-respiratory fitness.

Findings of the study

Table 1: Relationship between selected measures of central adiposity and cardio-respiratory fitness

Measure of Central Adiposity	'r' with Cardio Respiratory Fitness
Sagittal Abdominal Diameter	-0.621**
Waist Girth	-0.665**

**Correlation is significant at 0.01 level $r_{0.01}(28) = 0.463$

*Correlation is significant at 0.05 level $r_{0.05}(28) = 0.361$

Table- I revealed an inverse significant correlation for cardio-respiratory fitness with sagittal abdominal diameter and waist girth as the value obtained for calculated "r" were -0.621 and -0.665 respectively which were higher than the value of tabulated "r" which were 0.463 significant at 0.01 level.

Conclusion

The result of the study suggested an inverse significant correlation between cardio-respiratory fitness with sagittal abdominal diameter and waist girth. This signifies that a higher sagittal abdominal diameter or waist girth leads to lower cardio-respiratory fitness. Cardio-Respiratory fitness is a strong determinant of cardio-vascular diseases. The similar results were observed by Lin Y. Chen *et al.* (2019) in there biracial population-based cohort study of young to middle-aged individuals where it was observed that lower cardiorespiratory fitness and higher measures of adiposity were associated with lower heart rate variability.

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