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ORIGINAL ARTICLE

Correlation Between Body Mass Index Waist Hip Ratio and Body Fat Percentage with Blood Pressure in Sedentary Females Sedentary Lifestyle and Body Mass Index Alter Blood Pressure

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ABSTRACT

Introduction: The adoption of a sedentary lifestyle is a major contributor to the development of disease as well as to morbidity and mortality rates. People who have high blood pressure can benefit from regular physical activity since it lowers their blood pressure. A lower body fat percentage is connected with a lower risk of developing high blood pressure when engaging in physical activity. There is a clear correlation between the body mass index (BMI) and the percentage of body fat (BF%) in terms of the resting rate of sympathetic nerve discharge to skeletal muscle. A greater proportion of fat stored in the abdomen, as opposed to the gluteal region, is associated with an increased risk of a variety of health problems, including diabetes and cardiovascular disease. As a result, the waist-to-hip ratio should be determined in order to conduct an analysis of fat distribution that is separate from an assessment of total obesity.

The materials and procedures: Random selection was used to choose from the general population one hundred healthy sedentary volunteers and one hundred healthy non-sedentary subjects. Subjects in the age group (22-55 years) who had a BMI that was greater than 30 (kg/m2) were considered to be obese. Non-obese subjects were defined as having a body mass index (BMI) between 17.50 and 25.20 kg/m2 and an age range of 22 to 55 years. The purpose of this study was to investigate the differences between healthy sedentary and non-sedentary individuals in terms of parameters such as body mass index (BMI), waist-to-hip ratio (WHR), and body fat percentage (BF%). The participants ranged in age from 22 to 55 years old, and the correlation between these parameters and blood pressure was determined.

Results: The findings showed that sedentary subjects had higher levels of body mass index, waist circumference, and body fat percentage than non-sedentary subjects did, and there was a positive link between these parameters and blood pressure.

Conclusion: The conclusion is that a sedentary lifestyle is linked to an increase in Body Mass Index, Waist Hip Ratio, Blood Pressure, as well as Body fat percentage and fat mass. There was a link between BMI, WHR, BF%, and FM and blood pressure that was in the positive.

Keywords: Body fat; body mass index; sedentary lifestyle; waist-hip ratio

INTRODUCTION

Being physically inactive causes an imbalance between the amount of energy consumed and the amount of energy lost, which ultimately results in obesity. The adoption of a sedentary lifestyle is one of the primary contributors to disease, morbidity, and mortality. Those who have high blood pressure and participate in regular physical activity have a better chance of seeing their blood pressure numbers drop. A lower body fat percentage is connected with a lower risk of developing high blood pressure when engaging in physical activity. The effect of different patterns of body fat distribution on mortality confirms earlier clinical observations that a distribution of fat that is more concentrated in the abdominal region than in the gluteal region increases a person's vulnerability to a variety of health risks, including cardiovascular diseases and diabetes mellitus. Therefore, getting a WHR by clinical testing should be done in order to conduct an analysis of fat distribution that is separate from that of general obesity [1]. The adipose tissue not only stores fat but also functions as an endocrine organ, synthesising and releasing into the blood stream a wide variety of peptides and non-peptide compounds that may play a significant role in maintaining cardiovascular homeostasis. This is one of the many ways that the adipose tissue may contribute to the regulation of cardiovascular homeostasis. A large amount of tumour necrosis factor-alpha (also known as TNF-a) can be found in adipose tissue. Interleukin-6, Plasminogen activator inhibitor-1, Leptin, Angiotensinogen, and Insulin-like Growth Factor-1 (IGF-1) are all mentioned in [2]. The resting rate of sympathetic nerve discharge to skeletal muscle was found to have a clear correlation with both body mass index (BMI) and percentage of body fat, according to the findings of a study that involved healthy people and which also examined the activity of sympathetic nerves. A correlation was found between the activity of muscle sympathetic nerves and age, plasma insulin concentration, and plasma lactate concentration. Body fat was also a factor. These four co-variants were responsible for 58 percent of the sympathetic activity in the muscle. It has been determined that the amount of body fat a healthy individual possesses is a crucial factor in determining the rate of muscle sympathetic discharge during rest. The association between obesity and sympathetic activation could be one potential mechanism contributing to the increased prevalence of cardiovascular illnesses in overweight patients [3]. Overweight is related with sympathetic activation. The researchers evaluated children and teenagers to determine their blood pressure and the percentage of their bodies that were made up of fat. Their findings revealed an elevated heart rate, which points to some degree of enhanced sympathetic activity. The body mass index was consistently associated with increases in both the systolic and diastolic blood pressures across all age groups [4]. The body fat percentage threshold of 25% for males and 33% for women is an appropriate value for identifying obesity. After having the protocol of the non-invasive approach explained to them, each of the subjects granted their agreement to participate in the study. In order to rule out any potential health issues and prevent the data from being tainted by confounding factors, a thorough clinical examination of each system was performed in addition to a brief personal history that included questions about childhood obesity, a comprehensive history of physical activity, and more. During the morning session, anthropometric measurements as well as cardiovascular measures were taken. We measured a variety of physical parameters, including weight in kilogrammes, height in

centimetres, waist circumference in millimetres, hip circumference in centimetres, and midarm circumference in centimetres. When palpating the radial artery on the right side, cardiovascular measures such as blood pressure and pulse rate were tallied for one minute. Blood pressure was measured using a sphygmomanometer, and pulse rate was counted. In the patient information chart, all of the personal information, such as age and sex, as well as a brief history, was input, and a unique ID was assigned to each individual subject.

MATERIALS AND METHODS

The Physiology department was responsible for carrying out the work for this particular study.

Random selection was used to choose from the general population one hundred healthy sedentary females and one hundred non-sedentary participants. Subjects in the age range of 22-55 years old who had a body mass index (BMI) of more than 30 (kg/m2) were considered obese. Subjects with a BMI between 18.50 and 24.99 kg/m2 and an age range of 22 to 55 years were considered to be non-obese. The purpose of this study was to investigate the differences between healthy sedentary and non-sedentary individuals in terms of parameters such as body mass index (BMI), waist-to-hip ratio (WHR), and body fat percentage (BF%). The participants ranged in age from 22 to 55, and the correlation between these parameters and blood pressure was determined.

In this particular study, the criteria for exclusion were as follows:

Subjects suffering from endocrinal disorders

- Hypertensive individuals
- Pregnant and lactating women
- Subjects with renovascular and cardiovascular diseases
- Age less than 22 and more than 55 yrs.

After having the protocol of the non-invasive approach explained to them, each of the subjects granted their agreement to participate in the study. In order to rule out any potential health issues and prevent the data from being tainted by confounding factors, a thorough clinical examination of each system was performed in addition to a brief personal history that included questions about childhood obesity, a comprehensive history of physical activity, and more. During the morning session, anthropometric measurements as well as cardiovascular measures were taken. We measured a variety of physical parameters, including weight in kilogrammes, height in centimetres, waist circumference in millimetres, hip circumference in centimetres, and midarm circumference in centimetres. When palpating the radial artery on the right side, cardiovascular measures such as blood pressure and pulse rate were tallied for one minute. Blood pressure was measured using a sphygmomanometer, and pulse rate was counted. In the patient information chart, all of the personal information, such as age and sex, as well as a brief history, was input, and a unique ID was assigned to each individual subject.

Means by Which Data Is Collected

Data Before beginning the procedure, the participants in the study were given a rundown of the protocol that would be followed. Following an explanation of the significance of the study to each of the participants, signed agreement was obtained from them all. The selected subjects had their measurements taken for each of the following parameters.

Anthropometry of the Physical Body

The circumference technique is used to measure body shape by wrapping a flexible plastic measuring tape around the subject's body. Subjects were required to wear minimal thin clothing, and the measurement is typically carried out in the morning before breakfast and after the bladder has been emptied. The subjects were advised to maintain a regular and gentle breathing pattern while they were standing for the duration of the measurement, which prevents the subjects from clenching their abdominal muscles.

Height (Ht):

The subject's height was measured in centimetres while they were standing in the standard position. After being marked to stand upright against a level wall, the subject was then given a plastic measuring tape to use for the measurement. Accuracy was achieved with the use of a sliding wooden head piece. The height was measured to within 0.5 centimetres of accuracy. Both sedentary and non-sedentary participants were studied, and comparisons were performed between the two. For the purpose of making comparisons between the groups, students conducted an unpaired t-test. Pearson's correlation coefficient was used for the purpose of conducting correlation analysis in order to determine the degree to which certain anthropometric and blood pressure parameters are related to one another. In order to be declared statistically significant, the p-value has to be less than 0.05.

DISCUSSION

This is an analysis and discussion of the anthropometric and blood pressure parameters that were measured in sedentary and non-sedentary subjects that fell within the age range of 22 to 55 years old. Differences in the Mean values of all of the parameters will be evaluated and talked about in this section. In the course of our research, we found that the BMI of sedentary subjects increased by 3 kg/m2, and this change was statistically significant. A positive link can be seen between BMI and blood pressure measures. According to these findings, inactivity has a tendency to cluster with other unhealthy habits that have a negative effect on the amount and location of fat deposition in the body, which ultimately leads to obesity [9]. One of the main contributors to the obesity epidemics is the modern lifestyle, which is connected with easy availability to food, a lack of exercise, a sedentary life style, food high in calories, and excessive television viewing [10]. According to the findings of our research, the Mean WHR in sedentary subjects decreased by 0.02, which was statistically significant. This change also has a favourable link with blood pressure indicators in sedentary subjects. The presence of an excessive amount of catecholamine is thought to be the cause of a number of harmful processes, which, if allowed to continue, can either cause hypertension or make the condition worse. There was a correlation between atherogenic impact and visceral fat mass, but not peripheral fat mass. In our research, we found that subjects who led sedentary lifestyles had significantly higher levels of both systolic and diastolic blood pressure as compared to subjects who led active lifestyles. The mean systolic blood pressure rose by 7.9 mm of Hg, whereas the mean diastolic blood pressure rose by 6.6 mm of Hg. It is important to point out that the increase in SBP is greater than the rise in DBP. Inactivity leads to a reduction in the generation of nitric oxide (NO) by faulty endothelium, which in turn causes alterations in artery diameter, which in turn leads to vascular structural changes, which ultimately ends in hypertension. The percentage of body fat that sedentary subjects had risen by 4.3% on average. There was a favourable link between growing body fat percentage and further persistently increasing blood pressure in inactive patients. Both systolic and diastolic blood pressure went up. The method that was used to calculate the percentage of body fat in this study was based on BMI and involved the application of Deurenberg's equation. On the other hand, the majority of studies that have been conducted on the topic of body fat percentage have relied on the application of techniques such as bioelectrical impedence, hydrodensitometry, X-ray absorptiometry, and skin fold thickness. Multiple studies all came to the same conclusions, which is very interesting.

CONCLUSION

A sedentary lifestyle was found to be associated with increases in body mass index, waist-to-hip ratio, blood pressure, and both body fat percentage and fat mass. There was a link between BMI, WHR, BF%, and FM and blood pressure that was in the positive.

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