Research Article

The study of correlation between body composition and various cardiovascular parameters

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Abstract

Background: The present study was carried out to study the correlation between body composition and various cardiovascular parameters.

Material and methods: Study was carried out among M.B.B.S students of M. P. Shah Govt Medical College, Jamnagar. Total 210 students were taken. Depending on their Body Mass Index (BMI), they were categorized as normal weight (control group), underweight and overweight students. A comparative study was done to find out the correlation between BMI and various cardiovascular parameters.

Result: Our result revealed significant difference in various cardiovascular parameters like pulse rate, systolic blood pressure and diastolic blood pressure among different groups as well as male and females.

Conclusion: The present study shows a strong correlation between obesity and cardiovascular parameters especially increased blood pressure even among young age groups. This is especially important because of increasing risk of cardiovascular disease in young age groups.

Keywords: Body composition, Cardiovascular parameters

1. Introduction

The body composition refers to the relative percentage of body fat to fat free tissue[1]. Obesity is generally defined as a condition where a person's weight is more than the recommended weight for his or her age, gender and height.

Obesity is considered as a major risk factor for cardiovascular diseases[2]. The association between obesity and increased cardiovascular risk factors is well established, documented and shown in various studies[3-4].

In present study, the correlation between body composition and various cardiovascular parameters has been shown.

2. Materials and Methods

The study was carried out among M. B. B. S. students in Department of Physiology at M. P. Shah Govt. Medical College, Jamnagar, Gujarat and designed to show the correlation between body composition and various cardiovascular parameters. Total 210 students were taken. All were healthy and without any apparent cardiovascular diseases.

The Body Mass Index (BMI) was calculated as weight in kilograms divided by the height in meter square (Quetelet's index)[5]. According to calculated BMI, the subjects were divided into three groups, one control group and two study groups. Each group consists of total 70 subjects - 35 boys and 35 girls. Control group having BMI 18.5 Kg/ m^2 to 24.9 Kg/ m^2. Study groups having two subgroups, one Underweight having BMI < 18.5 Kg/ m^2 and second Overweight having BMI 25 or more Kg/ m^2.

Pulse rate was measured using three fingers in right radial artery and blood pressure was measured using sphygmomanometer by auscultatory method.

2.1 Statistical analysis

The appropriate statistical method ANOVA was employed. The probability value $p < 0.05$ considered as statistically significant and probability value $p > 0.05$ considered as statistically non significant.

3. Results

Table- 1: shows mean values of BMI in all the three groups. The difference of the three groups was found to be statistically significant.

Group	BMI (Kg/m^2)		
	Total	**Male**	**Female**
	Mean + SD	**Mean + SD**	**Mean + SD**
Underweight	16.88+0.95	16.78+0.85	16.64+0.75
Normal weight	21.78+1.05	21.98+1.35	20.66+0.95
Overweight	27.54+1.22	27.68+1.32	26.88+1.25
P value	< 0.05	< 0.05	< 0.05

Table- 2: shows mean values of pulse rate in all the three groups. The difference of the three groups was found to be statistically significant.

Group	Pulse rate (per minute)		
	Total	Male	Female
	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD
Underweight	72.44$\pm$3.04	74.08$\pm$2.85	70.04$\pm$2.24
Normal weight	74.78$\pm$3.55	74.80$\pm$3.65	73.56$\pm$3.05
Overweight	79.84$\pm$3.22	80.08$\pm$3.23	78.78$\pm$3.26
P value	< 0.05	< 0.05	< 0.05

Table- 3: shows mean values of systolic blood pressure in all the three groups. The difference of the three groups was found to be statistically significant.

Group	Systolic Blood Pressure (mm of Hg)		
	Total	Male	Female
	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD
Underweight	110.88$\pm$5.95	111.78$\pm$3.61	108.60$\pm$5.04
Normal weight	117.23$\pm$3.88	118.28$\pm$2.70	115.26$\pm$3.98
Overweight	123.04$\pm$3.22	122.60$\pm$2.98	121.88$\pm$3.25
P value	< 0.05	< 0.05	< 0.05

Table- 4: shows mean values of diastolic blood pressure in all the three groups. The difference of the three groups was found to be statistically significant.

Group	Diastolic Blood Pressure (mm of Hg)		
	Total	Male	Female
	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD
Underweight	72.20$\pm$4.68	74.78$\pm$4.56	70.54$\pm$4.22
Normal weight	75.80$\pm$3.98	76.88$\pm$4.35	74.66$\pm$4.85
Overweight	80.54$\pm$2.82	80.62$\pm$2.22	79.98$\pm$2.28
P value	< 0.05	< 0.05	< 0.05

4. Discussion

Pulse is an important determinant for knowing the condition of cardiovascular system. In our study, pulse rate/min increases significantly as weight increases. Increase in pulse rate with increasing weight may suggest the underlying hyperlipidemia, an alarming sign of underlying cardiovascular disease.[6]

Similarly, blood pressure is also an important indicator for knowing the underlying systemic disease. In our study, there is significant increase in systolic and diastolic blood pressure as BMI increases suggesting the underlying hemodynamic disturbances like change in cardiac output, blood volume as well as changes in hormone levels.[7]

5. Conclusion

Pulse and blood pressure are very basic and important gateway for knowing the underlying systemic conditions. In our study, pulse and blood pressure increases significantly as BMI increases. This emphasizes the early detection and control of excessive weight gain by life style modifications even from early childhood. This also emphasizes the fact that obesity (excessive weight gain) is the key factor for most of the underlying systemic diseases[8]. Further in depth studies with more sample size may provide a concrete point about it.

Acknowledgement

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