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Body mass index, heart rate and blood pressure between sportsperson and non-sportsperson

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Abstract

The purpose of the study was to evaluate the body mass index, resting heart rate and blood pressure of sportsperson and non-sportsperson. The subjects of the study were 40 male (20 sportsperson and 20 non-sports person) and 40 female (20 sportsperson and 20 non-sportsperson) subjects of Kurukshetra District of Haryana. The age of subjects was ranged 19 to 27 years. The BMI was calculated with the measures of weight and height. Resting heart rate and blood pressure variables were measured by using Automatic Digital Blood Pressure Monitor. The 't' tests were employed for analysing the data and the hypotheses were tested at 0.05 level of significance. According to our findings, no significant differences were found on BMI, heart rate, systolic blood pressure and diastolic blood pressure between male sportsperson and non-sportsperson. Significant difference was found between female sportsperson and non-sportsperson with regard to systolic blood pressure. There were no significant differences found on body mass index, heart rate and diastolic blood pressure between female sportsperson and non-sportsperson.

Keywords: BMI, heart rate and blood pressure

Introduction

The human animal is a very complex multicellular organism in which maintenance of life depends upon a vast number of physiological and biochemical activities. The sum of these activities enables the human being to live in and utilise his environment and to maintain the species by reproduction (Wilson, 1981) ^[4]. Human body is a complex machine. The sophisticated mechanism of our body has attracted scientists to probe into its complex nature. Exercise physiology proves rudimentary in measuring the effects of exercise and training on various systems of the human body. The physiological responses may vary with different types of exercise and training programme, age, sex and level of fitness (Tiwari, 2021) ^[3].

According to *National Heart, Lung and Blood Institute*, BMI is an estimate of body fat and a good measure of your patients' risk for diseases that can occur with overweight and obesity. For adults, a healthy weight is defined as the appropriate body weight in relation to height. This ratio of weight to height is known as the body mass index (BMI). People who are overweight (BMI of 25–29.9) have too much body weight for their height. People who are obese (BMI of 30 or above) almost always have a large amount of body fat in relation to their height. The higher the BMI, the higher the risk for heart disease, high blood pressure, type 2 diabetes, gallstones, osteoarthritis, sleep apnea, and certain cancers.

The cardiac cycle includes all the mechanical and electrical events that occur during one heartbeat. In mechanical terms, it consists of all heart chambers undergoing a relaxation phase (diastole) and a contraction phase (systole). During diastole, the chambers fill with blood. During systole, the ventricles contract and expel blood into the aorta and pulmonary arteries. Normal resting heart rate (RHR) typically varies between 60 and 100 beats/min. With extended periods of endurance training (months to years), the RHR can decrease to 35 beats/min or less. A RHR as low as 28 beats/min has been observed in a world-class, long distance runner. These lower training-induced RHRs result from increased parasympathetic stimulation (vagal tone), with reduced sympathetic activity playing a lesser role (Kenny *et al.*, 2012) ^[1].

Method and Procedure

The purpose of the study was to evaluate the body mass index, resting heart rate and blood pressure of sportsperson and non-sportsperson. The subjects of the study were 40 male (20 sportsperson and 20 non-sportsperson) and 40 female (20 sportsperson and 20 non-sportsperson) subjects of Kurukshetra District of Haryana.

The age of subjects was ranged 19 to 27 years. The BMI was calculated with the measures of weight and height. Resting heart rate and blood pressure variables were measured by using Automatic Digital Blood Pressure Monitor. To find out the significance differences between sportsperson and non-sportsperson with regard to BMI, resting heart rate and blood pressure (systolic and diastolic blood pressure) 't' tests were employed with the help of SPSS software. The level of significance was set at .05 level of confidence.

Results and Findings

For the finding of the significance differences between sportsperson and non-sportsperson with regard to body mass index, resting heart rate and blood pressure the following tables 1 and 2 have been given as the results of the study.

Table 1: Comparison of Sportsperson (SP) and Non-Sportsperson (NSP) on Body Mass Index

Variable	Group	N	Mean	Sd	t-value	P-value (sig)
Body Mass Index (BMI)	Male SP	20	23.67	2.83	2.318	0.883
	Male NSP	20	26.03	3.57		
	Female SP	20	24.12	3.78	0.167	0.783
	Female NSP	20	24.33	4.16		

*Significant at 0.05 level

It can be seen from Table-1 that there was no significant difference found with regard to BMI between male sportsperson and non-sportsperson as the t-value 2.318 and P-value 0.883 found higher than 0.05 level of significance ($p > 0.05$) and no significant difference found with regard BMI between female sportsperson and non-sportsperson as the t-value 0.167 and P-value 0.783 found higher than 0.05 level of significance ($p > 0.05$).

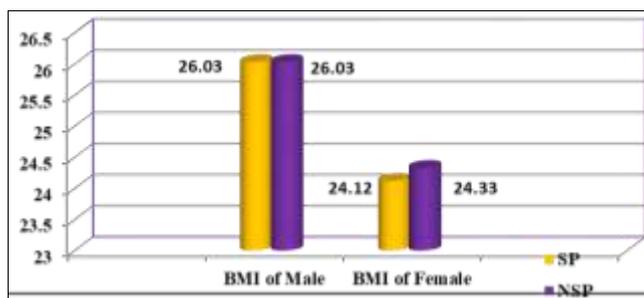


Fig 1: Graphical Representation of Mean Scores of Sportsperson and Non-Sportsperson on Body Mass Index

Table 2: Comparison of Sportsperson (SP) and Non-Sportsperson (NSP) on Resting Heart Rate

Variable	Group	N	Mean	Sd	t-value	P-value(sig)
Resting heart rate	Male SP	20	74.20	12.80	1.127	0.622
	Male NSP	20	78.50	11.29		
	Female SP	20	73.50	6.64	2.049	0.612
	Female NSP	20	79.90	6.93		

*Significant at 0.05 level

It can be seen from Table-2 that there was no significant difference found with regard to resting heart rate between male sportsperson and non-sportsperson as the t-value of resting heart rate (1.127) and P-value of resting heart rate (0.622) found higher than 0.05 level of significance ($p > 0.05$) and no significant difference found with regard to resting heart rate between female sportsperson and non-

sportsperson as the t-value 2.049 and P-value 0.612 found higher than 0.05 level of significance ($p > 0.05$).

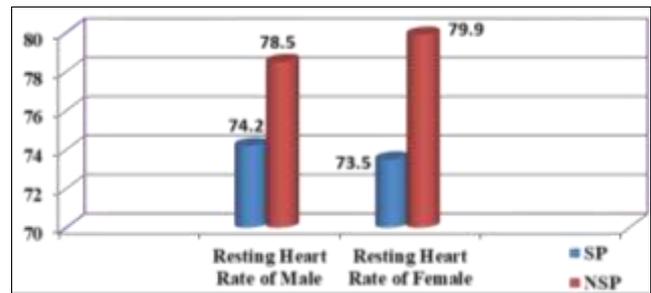


Fig 2: Graphical Representation of Mean Scores of Sportsperson and Non-Sportsperson on Resting Heart Rate

Table 3: Comparison of Male Sportsperson (SP) and Non-Sportsperson (NSP) on Blood Pressure (Systolic and Diastolic Blood Pressure)

Variable	Group	N	Mean	Sd	t-value	P-value(sig)
Systolic	SP	20	117.60	13.92	2.548	0.827
	NSP	20	128.15	12.20		
Diastolic	SP	20	75.05	10.03	2.392	0.847
	NSP	20	82.35	9.24		

*Significance at 0.05

It can be seen from Table-3 that there were no significant differences found with regard to systolic blood pressure and diastolic blood pressure between male sportsperson and non-sportsperson as the t-values systolic=2.548 and diastolic=2.392 and P-values (systolic=0.827 and diastolic=0.847) found higher than 0.05 level of significance ($p > 0.05$).

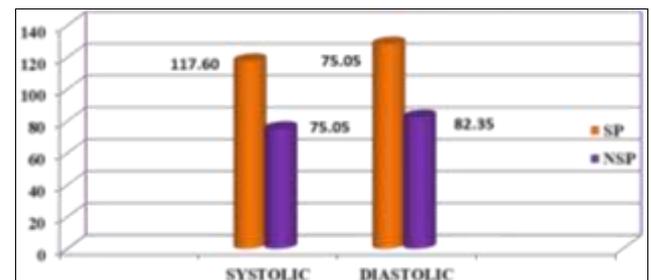


Fig 3: Graphical Representation of Mean Scores of Male Sportsperson and Non-Sportsperson on Blood Pressure (Systolic and Diastolic)

Table 4: Comparison of Female Sportsperson (Sp) and Non-Sportsperson (NSP) On Blood Pressure (Systolic and Diastolic Blood Pressure)

Variable	Group	N	Mean	Sd	t-value	P-value(sig)
Systolic	SP	20	117.20	6.40	0.266	0.012*
	NSP	20	118.05	12.78		
Diastolic	SP	20	79.45	5.35	0.378	0.070
	NSP	20	80.25	7.79		

*Significance at 0.05

It can be seen from Table-4 that significant difference was found with regard to systolic blood pressure between female sportsperson and non-sportsperson as the t-value 0.266 and P-value 0.012 found lower than 0.05 level of significance ($p < 0.05$) and no significant difference was observed with regard to diastolic blood pressure between female sportsperson and non-sportsperson as the t-value 0.378 & P-

value 0.070 was found higher than 0.05 level of significance ($p > 0.05$).

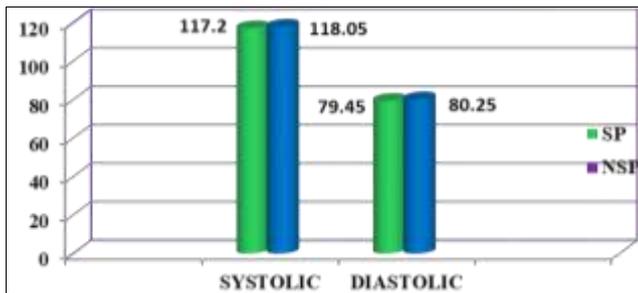


Fig 4: Graphical Representation of Mean Scores of Female Sportsperson and Non-Sportsperson on Blood Pressure (Systolic and Diastolic)

Conclusions

In the light of the findings and limitations of the present study the following conclusions were drawn:

- No significant differences were found between sportsperson and non-sportsperson in both male and female with respect to Body Mass Index (BMI).
- There were no significant differences found between sportsperson and non-sportsperson in both male and female on resting heart rate.
- No significant differences were found between male sportsperson and non-sportsperson with regard to systolic and diastolic blood pressure.
- Significant difference was found between female sportsperson and non-sportsperson with regard to systolic blood pressure and no significant difference was found between female sportsperson and non-sportsperson on diastolic blood pressure.

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