

## A SHORT STUDY ON CHANGE IN BP WITH BMI IN OBESE AND NONOBESE YOUNG GIRL STUDENTS.

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### ABSTRACT

**Title:** Short study on change in BP and BMI in obese and non obese young girl students.

**Introduction:** High blood pressure (BP) is a major determinant of cardiovascular events in obesity. This study was undertaken to analyze the differences in certain well-defined cardiovascular parameters in obese and non-obese young girl students between age 17 to 21 with respect to their BMI.

**Aims and Objectives:** To compare change in BP and BMI in obese and non obese young girls.

**Materials and methods:** This study was conducted on 50 girl students of our medical college. The parameters studied were change in BP and BMI. They were divided in to 2 groups, obese and non obese. Their baseline BP, SBP after moderate exercise and their body mass index were noted. The values obtained were analyzed by unpaired t test and p value <0.05 considered as significant.

**Results:** The mean and std dev of SBP after moderate exercise in obese and non obese young girls were 143.64±18.4184 and 132.08±12.6948 respectively and their p value is 0.0129. The mean and std dev of BMI in obese and non obese young girls were 25.7048±0.0578 and 20.8316±0.5185 respectively and their p value is 0.0001. The mean and std dev of change in BP in obese and non obese young girls were 32.6±18.5539 and 22.24±12.2925 respectively and their p value is 0.0242.

**Conclusion:** There is a significant rise in SBP in obese girls with moderate exercise limiting their physical abilities.

**Key words:** BMI, Obesity, Hypertension, Exercise

### INTRODUCTION

The journey from early life obesity to cardiovascular disease will be evident by slow regression of their cardio respiratory efficiency. Body fat and physical fitness are considered as modifiable and independent risk factors for cardiovascular mortality (Prabhu.S, et.al, 2013).

Now obesity is significant health issue around the world (Flegel K.M, et.al 2010) Generally terms obesity and overweight are used as if they are synonymous but exactly they are not. But both terms denotes excessive bodyweight but obesity is much more advanced state. The definitions and criteria of obesity mainly depend on the methods using to determining it. The relation between blood pressure and bodyweight were demonstrated and explained in Framingham Heart Study in 1960s (Kannel W.B, et.al 1967). The relation between bodyweight and blood pressure remained obscure until mid 1980. But in mid1980 clinical research clarified the relationship between these two complex and common regulatory disturbances. Now in many parts of the world obesity has become major public health concern.

Obesity and overweight are defined as excessive accumulation of fat that may impair the health of an individual. In India this rising prevalence of overweight has direct correlation with obesity based morbidity involving hypertension, metabolic syndrome, dyslipidemia, type 2 diabetes mellitus, and cardiovascular disease (Gupta.R,et.al,2002), (Gupta.R, et.al, 2007). Significantly BMI is associated with body fat in children and adolescents. Also BMI is known as Quetelet index and it is defined as weight in kilograms divided by height in squares measured in meters,  $\text{kg/m}^2$  and used to assess the body fat. Cardiovascular outcomes and mortality closely associated with high BMI (Wormser.D, et.al, 2011), (Poirice.P, et.al, 2006). Obesity and overweight increases the risk of high blood pressure, ischemic stroke, coronary heart disease and type 2 diabetes mellitus. Cardio respiratory fitness was significantly affected among young obese individuals than the non obese individuals. So in young obese individuals risk of hypertension is increased and also other cardiovascular co-morbidities develop later in life (Shirur S.Y, et. al, 2014) Abnormalities like reduction in lung volume, expiratory flow rates are most frequently reported. Body mass index is positively associated with hypertension, cardiovascular disease, type II diabetes mellitus, and other chronic diseases. Dr Yano in his study in 2015 reported that high body mass index and high cholesterol levels in young and middle aged adults showed isolated systolic hypertension (Yano.Y, et. al, 2015). From the above study it appears that with increased weight there is a significance change in cardio respiratory performance. Hence we would like to investigate the amount of change in SBP in young healthy and obese girl students after moderate exercise.

## MATERIALS AND METHODS

50 girl students were selected from a medical college, Mangalore aged between 17 to 21 years. Informed consent was taken from the study group. This group was divided in to obese and non obese of 25 each based on their BMI. For this study ethical approval has been obtained from institute's ethical clearance committee. For the assessment of obesity, most widely used clinical parameter is BMI. It is an easy and inexpensive method of screening the categories of weight. Body mass index above  $18.5\text{kg/m}^2$  considered as normal, between 23 to  $25\text{kg/m}^2$  is overweight and more than  $25\text{kg/m}^2$  as obese (Beniwal.P.R, et. al, 2014). BMI is associated with morbidity and mortality along with hypertension, type 2 diabetes mellitus, cardiovascular disease and other chronic diseases (Sunyer. FX.Pi, 1993). Their baseline BP and SBP after moderate exercise were taken by using ELCO Mercurial Sphygmomanometer manufactured by Anita Industries, New Delhi. At first their baseline BP were noted and then asked them to do moderate exercise for 10 minutes and later their SBP after moderate exercise were noted down by using Mercuric Sphygmomanometer. Their body mass index was calculated by height weight BMI machine supplied by Swastik system and services, Delhi, India. Their body mass index calculated by using formula weight in kilograms divided by height in meters squared and their change in BP were calculated. Computer software used for analysis is The statistical software SPSS VER 17 & MS Excel (2007).

### Inclusion Criteria

For Obese:

- Must be girls between age group 17 and 21.
- BMI above  $23\text{kg/m}^2$
- Not under medication
- No respiratory and heart diseases.
- No menstruation during data collection.

For Non obese:

- Must be girls between age group 17 and 21.
- BMI between  $18.5 - 23\text{kg/m}^2$
- Not under medication
- No respiratory and heart diseases
- No menstruation during data collection.

### Exclusion criteria:

For obese:

- Medication.
- Menstrual period.
- Respiratory and heart diseases.

For non obese:

- Medication.
- Menstrual period.
- Respiratory and heart diseases.

**RESULTS**

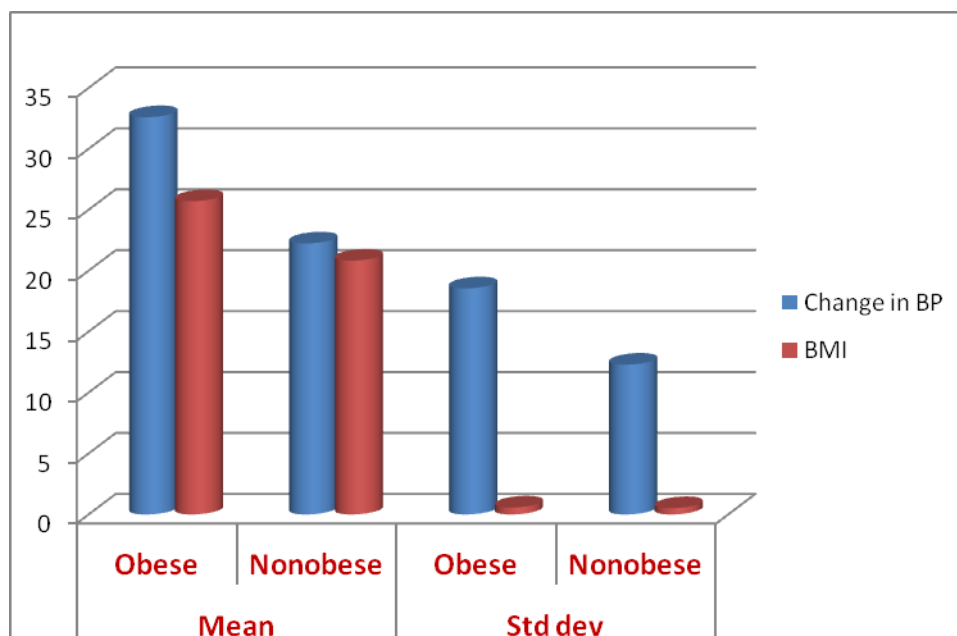
The mean baseline BP and mean std dev of obese and non obese young girls were 111.04±6.7914 and 109±3.2103 respectively and their p value by unpaired two tailed t test was 0.4284. The mean and std dev of SBP after moderate exercise in obese and non obese young girls were 143.64±18.4184 and 132.08±12.6948 respectively and their p value by unpaired two tailed t test was 0.0129. The value is statistically significant. The mean and std dev of BMI in obese and non obese young girls were 25.7048±0.0578 and 20.8316±0.5185 respectively and their p value by unpaired two tailed t test is 0.0001 and the value is statistically significant (Table 1). The mean and std dev of change in BP in obese and non obese young girls were 32.6±18.5539 and 22.24±12.2925 respectively(Graph 1) and their p value by unpaired two tailed t test is 0.0242 and is statistically significant.

**Table-1: Mean± SD of Baseline BP, SBP after moderate exercise, BMI and Change in BP**

Parameters	Obese (n=25) mean± std dev	Non obese (n= 25) mean ±std dev	P value
Baseline BP (mm/ Hg)	111.04±6.7914	109.84±3.2103	0.4284*
SBP after exercise (mm/Hg)	143.64±18.4184	132.08±12.6948	0.0129**

(mm/Hg )= BP is measured by using unit millimeter of mercury.

P value for baseline BP is 0.4284\* P value for SBP after exercise is 0.0129\*\*



**Graph 1: Change in BP with BMI in obese and non obese young girls:**

Std dev-Standard deviation. BMI- Body mass index.

## DISCUSSION

In this study SBP after moderate exercise, BMI and change in BP between obese and non obese young girls were statistically significant. But base line BP was not statistically significant.

Obesity is often defined as a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health of the individual may be impaired. Body Mass Index providing us the most useful population level measurement of obesity in individuals. It can help us to estimate the prevalence of obesity within a population and the risks and complications associated with it. Etiologically obesity is multi factorial but causes are sedentary behavior patterns, inadequate physical activity, lack of exercise and excessive calorie intake (Tremblay.MS, et.al, 2010). Obesity produces an increase in total blood volume and cardiac output that is caused in part by increased metabolic demand which is induced by excess body weight. Poor dietary choice, poor physical activity, disturbed sleep patterns, increased stress also many other factors results in increased weight gain and obesity in college going young adults(Haupt.C, et.al, 2005),(Serlachius,et.al,2007)

Increased body weight contributes development of metabolic syndrome in adolescents and young adults including increased BP, increased abdominal fat and impaired glucose tolerance. Decline in physical activity in all age groups highly contributed to rising rates of obesity in the world (Heitmann.B, et.al, 1997). Excessive TV watching also associated with intake of high energy. Physical activity can prevent or sometimes may delay the development of high BP and also reduces the blood pressure in hypertensive.

## CONCLUSION

Our study tells that change in BP with BMI between obese and non obese young girls are significantly different. It means obese girls were having more BP than the non obese girls. There is a significant rise in SBP in obese girls with moderate exercise limiting their physical abilities.

## ACKNOWLEDGMENT

We acknowledge Dr Krishna Prasad, Dean, Srinivas Institute of Medical Science and Research Centre, for his support for the research paper.

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ISSN : 0976-4550

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