

Association of Sympathetic Activity with Body Mass Index in Male Adults of North Indian by Hand Grip Dynamometer

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Abstract

Background: The most significant determinants of hypertension have been established as obesity and overweight. The positive relationship between handgrip intensity and Blood Pressure could be clarified by several mechanisms. **Subjects and Methods:** Body mass index, Hand grip dynamometer and Blood pressure of the n= 120 subjects, age =18-25. The blood pressure and hand grip dynamometer test was recorded by following standard procedure. **Results:** The finding of this study is sympathetic activity was increased in overweight and in obese as compared to normal body mass index hand grip dynamometer test. **Conclusion:** The sympathetic activity was increased in overweight and in obese subjects as compared to normal body mass index after hand grip dynamometer test.

Keywords: Blood pressure, Body mass index, Hand grip dynamometer.

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Introduction

There is common consensus that one of the most influential risk factors for the rise in body mass index is a sedentary lifestyle. No nation has yet been successful in reversing the obesity rates experienced over the 30 years.^[1]

The inflated body mass index may be a major risk issue for many of the non communicable diseases like musculoskeletal disorders, polygenic disorder, carcinoma in colon, breast, hypertension, hyperlipidemia more firmly to intra-abdominal or apple shaped plumpness than to overall adiposity.^[2]

In previous studies, cardiovascular reactivity was amplified in obesity, which was a major risk factor for hypertension.^[3] The prevention of adolescent obesity needs a frame of mind with a desire for carrying out healthy behaviors. According to evolution of the World health organization 2008, incidence of hypertension has become major public health problem in Indian population (21%) including others countries of the world.^[4]

A previous study also recorded an overall rise in the prevalence of overweight and obesity in men and women aged 15-49 years between 1998 and 2006, from 11 percent to 15 percent.^[5] A modifiable and important risk factor for coronary artery disease, heart failure, cardiovascular disease and chronic renal

failure is hypertension.^[6]

Hand grip strength was associated positively and substantially with DBP in men. Handgrip strength, particularly for those who are overweight and obese, appears to increase the risk of male hypertension.^[7] The positive relationship between handgrip intensity and BP could be clarified by several mechanisms. Due to decreased sympholysis, with chronological age, peripheral vascular resistance increases, morphological changes increased or vascular resistance increased.^[8]

Subjects and Methods

This observational study was carried out over a period of 12 months at the Department of Physiology, Teerthanker Mahaveer Medical College & Research Center, Moradabad.

Inclusion criteria

- 18-25 Years age group volunteers.^[9]
- BMI (18-30 Kg/M²).^[10]

Exclusion criteria

- Bone injury in dominating hand
- History of drug intake
- Any systemic disease

Methodology

The present observational study was conducted among 120 volunteers. This study began after approval by Institutional Ethical Committee. Before starting this study, written informed consent was obtained from each participant. Measurement of blood pressure and hand grip dynamometer participant was asked to sit comfortably for 5-8 minutes before measuring the blood pressure. The cuff was tied over the upper arm 2-4 cm. then the bell of stethoscope was lightly pressed above the brachial artery, compressing air pump, mercury level was raised up to 40-50 mmHg over the systolic level as determined by palpatory method. Gradually pressure was released until a clear beating sound was heard and the BP was recorded by auscultatory method.^[11] Subject was asked to hold the hand grip dynamometer and compress it with maximum effort. The tension developed was recorded. The procedure was repeated thrice, with one minute rest after each. The average of the three reading was calculated. The subject was now asked to maintain a pressure of 30% of T_{max} for 1 min and blood pressure was recorded immediately after relaxation of effort.^[12]

Results

[Table 1] shows the comparison of SBP with different groups of BMI before and after sympathetic stimulation by HGT. In normal BMI 24 subjects were normal 45 subjects were pre hypertensive and 1 subject was stage 1 hypertensive. In overweight 3 subjects were normal 13 subjects were pre hypertensive. In obese 2 subjects were normal 26 were pre hypertensive and 6 subjects were stage 1 hypertensive.

[Table 2] shows the comparison of DBP with different groups of BMI before and after sympathetic stimulation by HGT. In normal BMI 41 subjects were normal 28 subjects were pre hypertensive and 1 subject was stage 1 hypertensive. In overweight 9 subjects were normal 6 subjects were pre hypertensive and 1 subject was stage 1 hypertensive. In obese 8 subjects were normal 20 subjects were pre hypertensive 3 subjects were stage 1 hypertensive and 3 subjects were stage 2 hypertensive.

The relation of body mass index with blood pressure after sympathetic stimulation by handgrip dynamometer test in 120 volunteer subjects. The findings of this study was sympathetic activity was increased in overweight and in obese as compared to normal body mass index after hand grip dynamometer test

Discussion

Linderman G C et al. studied in 2018 the wide ranging population and tens of thousands of subgroups, the correlation among BP and BMI is constructive, indicating that the pattern of BMI encryption would be correlated with the prevalence of hypertension across almost all segments of the residents.^[13]

In our study we found the positive association between body mass index and blood pressure in male adults

According to Kalpana B et al. in 2016 the diastolic blood pressure in obese individual was substantially alleviated at rest, but showed a reduced increase through the HGT relative to average weight individual.^[14]

Jain A et al. in 2016 was found that the autonomic changes may be more related to the percentage of body fat rather than BMI. Increases in DPB were compared in various subgroups during HGT.^[15]

According to our findings the autonomic alterations was more related to BMI and blood pressure was increased in different groups of BMI after stimulation by the hand grip dynamometer test.

Verma A et al. the maximum CVR was observed in response to HGT in subjects of both sexes, when the time of exposure to stress was 1 min in each case.^[16]

Conclusion

The present study was conducted among 120 healthy young adults the age of 18-25 who were the students of Teerthanker Mahaveer University, Moradabad (U.P).

The purpose of this study was to find out the association of body mass index with sympathetic function in males adults.

The findings of this study are sympathetic activity was increased in overweight and in obese as compared to normal body mass index after hand grip dynamometer test.

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Table 1: Comparison of SBP in different group of BMI before and after sympathetic stimulation by using HGT (n=120)

		HGT_SBP			Total	
		Normal	Pre sion	Hyperten- sion	Stage I Hyper- tension	
BMI	Normal weight	24	45		1	70
	Obese	3	13		0	16
		2	26		6	34
Total		29	84		7	120

Table 2: Comparison of DBP in different group of BMI before and after sympathetic stimulation by using HGT (n=120)

		HGT_DBP				Total	
		Normal	Pre tension	Hyper- tension	Stage I Hyper- tension	Stage II Hypertension	
BMI	Normal	41	28		1	0	70
	Overweight	9	6		1	0	16
	Obese	8	20		3	3	34
Total		58	54		5	3	120

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