

Evaluation of Relationship of Hypertension and Obesity with Lifestyle Factors in a Known Population in South India

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ABSTRACT

Background: Obesity is associated with increased blood flow, vasodilation, cardiac output, and hypertension. The present study was conducted for assessing the frequency of hypertension and obesity and their relationship with lifestyle factors in a known population.

Materials & Methods: A total of 200 of subjects were screened in the present study. Demographic and lifestyle data were obtained by standardized questionnaires. Blood pressure (BP) was measured. Individuals with SBP 140 mmHg and DBP 90 mmHg were considered hypertensive and other individuals were in normal range. Physical activity was assessed using a physical activity questionnaire (PAQ). The metabolic equivalent of task minutes per week for each of walking, moderate-intensity, and vigorous-intensity activities were calculated. Food habits and usual dietary intake were assessed.

Results: A total of 200 subjects were enrolled. The mean age of the patients was 42.8 years. 66 percent of the patients were males while the remaining were females. Hypertension was seen in 10 percent of the patients while obesity was seen in 42.5 percent of the patients. Also, our results showed that most of activity of females was significantly higher than males.

Intake of high amount of yogurt, rice, egg, cheese and chicken were extensive risk factors for obesity while coffee intake in large amounts was a risk factor for hypertension.

Conclusion: Obesity and hypertension affect a significant amount of patient population and are significantly associated with lifestyle and dietary habits.


Key words: Obesity, Hypertension, Lifestyle.

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INTRODUCTION

Obesity is traditionally defined as a weight $\geq 20\%$ above the ideal weight, which corresponds to the lowest death rate for individuals of a specific height, gender and age.¹ More recent guidelines for obesity have introduced the use of a measurement known as body mass index (BMI), which is calculated by the individual's weight multiplied by 703 and divided by twice the height in inches. The value of BMI is now used to diagnose the stage of overweight or obesity thereby fixing at 25.9–29 the limited BMI considered as overweight, while a BMI >30 constitutes obesity.²

According to the World Health Organization (WHO), in 2005, approximately 1.6 billion adults over the age of 15 were overweight.³ At least 400 million adults were considered obese and ≥ 20 million children under the age of 5 years were overweight. The estimation for the current year (2015) is approximately 2.3 billion overweight adults and over 700 million obese ones.⁴ Obesity is associated with increased blood flow,

vasodilation, cardiac output, and hypertension. Although cardiac index (cardiac output divided by body weight) does not increase, cardiac output and glomerular filtration rate do. However, renal sodium retention also increases, leading to hypertension. The factors generally considered responsible for obesity-related alterations in the pressure-natriuresis curve include enhanced sympathetic tone, activation of the renin-angiotensin system (RAS), hyperinsulinemia, structural changes in the kidney, and elaboration of adipokines (hormones produced in fat itself) such as leptin.

Sympathetic blockade (combined alpha and beta blockade) prevents obesity-related hypertension in experimental animals and in patients.⁴⁻⁷

Hence, the present study was conducted for assessing the frequency of hypertension and obesity and their relationship with lifestyle factors in a known population.

MATERIALS & METHODS

The present study was conducted in the Department of Community Medicine, Sri Muthukumaran Medical College Hospital and Research Institute, Chennai, Tamil Nadu (India) for assessing the frequency of hypertension and obesity and their relationship with lifestyle factors in a known population. A total of 200 of subjects were screened in the present study. Standardized questionnaires were utilized to gather data on lifestyle and demographic aspects. The current study excluded patients with a history of systemic disease or known medication sensitivity. Anthropometric measurements were made, such as weight and height. Overweight is defined as having a BMI between 25 and

29.9, while obesity is defined as having a BMI of 30 or above. A blood pressure (BP) reading was taken. People who had a DBP of 90 mmHg and an SBP of 140 mmHg were classified as hypertensive, whereas everyone else was within the usual range. The Physical Activity Questionnaire (PAQ) was used to measure physical activity. For walking, moderate-intensity, and vigorous-intensity activities, the metabolic equivalent of task minutes per week were computed. Dietary habits and consumption were evaluated. All the results were recorded in Microsoft excel sheet and was subjected to statistical analysis using SPSS software. Chi-square test and student t test was used for evaluation of level of significance.

Table 1: Prevalence of hypertension by exposure variables

Variables		Hypertension absent	Hypertension present	p-value
Gender	Males	118	14	0.46
	Females	62	6	
BMI	Normal	95	10	0.38
	Abnormal	85	10	

Table 2: Mean scores for physical activity

Total physical activity	Males	Females	p-value
Mean	1596.2	2123.7	0.001 (Significant)
SD	1325.8	1985.4	

Table 3: Dietary intake

Food groups	Normotensive	Hypertensive	p-value	Obese	Non-obese	p-value
Milk	5.1	4.9	0.12	4.6	5.1	0.61
Yogurt	4.6	4.1	0.24	5.9	3.3	0.00*
Bread	10.2	11.3	0.62	11.6	8.3	0.00*
Rice	8.4	7.6	0.35	7.2	5.1	0.00*
Corn	1.6	1.2	0.38	1.9	2.3	0.82
Biscuits	3.8	3.2	0.41	4.1	5.2	0.77
Butter	12.8	11.8	0.16	11.7	12.6	0.28
Egg	10.7	9.8	0.28	9.5	6.2	0.00*
Cheese	5.4	6.3	0.88	6.7	4.3	0.00*
Fruits	3.8	4.1	0.43	4.9	3.9	0.72
Cream and creamy	3.6	4.6	0.19	3.3	3.9	0.45
Vegetables	12.6	11.7	0.64	11.9	10.5	0.28
Chicken	10.8	11.3	0.28	11.8	9.3	0.00*
Coffee	13.2	7.5	0.00*	12.6	11.9	0.64

RESULTS

A total of 200 subjects were enrolled. The mean age of the patients was 42.8 years. 66 percent of the patients were males while the remaining were females. Hypertension was seen in 10 percent of the patients while obesity was seen in 42.5 percent of the patients. Also, our results showed that most of activity of females was significantly higher than males. Intake of high amount

of yogurt, rice, egg, cheese and chicken were extensive risk factors for obesity while coffee intake in large amounts was a risk factor for hypertension.

DISCUSSION

Obesity, as defined by bodily weight (body weight) and by bodily conformation-derived variables, accompanies hypertension in

many patients. Both conditions are independent cardiovascular risk factors. In This association between obesity and hypertension forms part of a broader relationship between body weight and blood pressure (BP). In the general population, BP bears a positive linear correlation with BMI and waist-to-hip ratio over the continuous ranges of normal and unfavourable values of these three variables. Patients who present hypertension and obesity usually present other unfavourable conditions for cardiovascular prognosis, including changes in carbohydrate and lipid metabolism, hyperuricaemia, left ventricular hypertrophy, and/or the obstructive sleep apnoea syndrome. On average, hypertension is salt-sensitive in obese patients, and plasma volume and cardiac index are increased.⁸⁻¹⁰

Obesity per se may have structural effects on the kidneys that may perpetuate hypertension, leading to an increased incidence of end-stage renal disease that results in further hypertension. Adipose tissue may elaborate angiotensin from its own local renin-angiotensin system. The distribution of body fat is considered important in the genesis of the obesity-hypertension syndrome, with a predominantly central distribution being particularly ominous. Weight loss is the cornerstone in the management of obesity-hypertension syndrome. It may be achieved with diet, exercise, medications, and a combination of these measures.⁶⁻⁸ Hence; the present study was conducted for assessing the frequency of hypertension and obesity and their relationship with lifestyle factors in a known population.

A total of 200 subjects were enrolled. Mean age of the patients was 42.8 years. 66 percent of the patients were males while the remaining were females. Hypertension was seen in 10 percent of the patients while obesity was seen in 42.5 percent of the patients. Also; our results showed that most of activity of females was significantly higher than males. Intake of high amount of yogurt, rice, egg, cheese and chicken were extensive risk factors for obesity while coffee intake in large amounts was a risk factor for hypertension. Chaput JP et al compared two traditional (high dietary lipid intake and non-participation in high-intensity physical exercise, namely the 'Big Two' factors) versus three nontraditional (short sleep duration, high disinhibition eating behavior, and low dietary calcium intake) risk factors as predictors of excess body weight and overweight/obesity development. Adult participants aged 18–64 years of the Quebec Family Study were selected for cross-sectional (n = 537) and longitudinal (n = 283; 6-year follow-up period) analyses. The main outcome measure was overweight/obesity, defined as a BMI ≥ 25 kg/m². They observed that both the prevalence and incidence of overweight/obesity was best predicted by a combination of risk factors. However, short sleep duration, high disinhibition eating behavior and low dietary calcium intake seemed to contribute more to the risk of overweight and obesity than high dietary lipid intake and non-participation in high-intensity physical exercise. Globally, the risk of being overweight or obese was two-fold higher for individuals having the three nontraditional risk factors combined (OR 6.05; 95% CI 4.26–7.88) compared to those reporting a high percentage of lipids in their diet together with no vigorous physical activity in their daily schedule (OR 2.95; 95% CI 2.18–3.73). Furthermore, the risk of overweight/obesity was also higher for the combination of any two of the nontraditional risk factors than for the combination of the 'Big Two' factors. These results are concordant with previous reports showing that obesity is a multifactorial condition, and

emphasize the importance of looking beyond reported measures of the 'Big Two' factors.¹¹

Bansal SK et al identified the prevalence and risk factors for hypertension in a rural community in north-east India. A door-to-door survey was conducted amongst all residents of a village in Uttarakhand province. All residents were interviewed, and data were relating to the demographics of the individuals, dietary habits, alcohol consumption, tobacco use, psychosocial stress, past medical history and drug history. Blood pressure (BP) and anthropometric data were recorded, and blood samples taken. They identified 1348 people living in the village. Assessment was carried out on all those aged 15 years and over (n=968, 71.8%). Hypertension, defined as BP $\geq 140/90$ mmHg or cases of known hypertensive on medication, were present in 30.9% (95% CI 25.6 to 36.0) of males and 27.8% (95% CI 23.4 to 32.2) of females. Standardisation to the World Health Organization (WHO) world population gives an overall prevalence of 32.3% (95% confidence interval, CI 28.9 to 35.8). Increasing age and higher body mass index (BMI) were independent predictors of hypertension in both sexes, with psychosocial stress an additional independent predictor in males. Rates of hypertension in the rural community under study are similar to those seen in high-income countries and in urban India.¹²

CONCLUSION

Obesity and hypertension affect a significant amount of patient population are significantly associated with lifestyle and dietary habits.

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