

Original research article

**HYPERTENSION AND OBESITY IN YOUNG ADULT
FEMALES A PROSPECTIVE OBSERVATIONAL STUDY**

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Abstract

The occurrence of obesity and hypertension is increasing among young adults and adolescents in India. The rise in this problem is ascribed to changes in dietary habits, such as the increased use of processed food, together with a sedentary lifestyle. Childhood or adolescent-onset hypertension remains into adulthood. This study aimed to ascertain the prevalence of obesity and hypertension in females aged 18 to 20.

Keywords: Hypertension, obesity, adult, females

Introduction

According to the 2015 Global Burden of Disease data, there was a rise in the number of hypertension cases in India ^[1]. It was predicted that there will be a 111% increase in cardiovascular mortality in India by the year 2020 ^[2]. Hypertension is sometimes called a "silent killer" since most people with hypertension do not have any obvious symptoms. People with hypertension often have symptoms such as headaches, shortness of breath, dizziness, chest pain, and irregular heartbeats. Hypertension can develop throughout infancy and adolescence, but it may go unnoticed since there are no visible signs or symptoms ^[3, 4].

Hypertension in Asian teenagers has been associated with obesity ^[5]. In the last two decades, there has been a worldwide decline in physical activity and a change in dietary patterns ^[6]. Participating in physical activity is considered essential for reducing hypertension in adolescents. The World Health Organisation (WHO) recommends that adults aged 18 to 64 should participate in 30 minutes of physical activity, five days a week, to lower the chances of developing non-communicable diseases ^[7-16].

The prevalence of hypertension has increased in adolescents and preadolescents ^[8]. This phenomena can be attributed to the rise in obesity, which is a result of modified dietary preferences and decreased levels of physical exercise [9]. Table 1 presents findings from a study conducted on children who have been diagnosed with HT. The studies indicate a rise in the incidence of pre-hypertension and hypertension among young children and adolescents, with the occurrence increasing from 8.5% in 2006 to 20.2% in 2017. The purpose of this study was to ascertain the frequency of obesity and

hypertension in adult females.

Materials and Methods

The research was carried out utilising a cross-sectional methodology and involved a cohort of 450 adult females. The study sought to calculate the body mass index (BMI) and assess blood pressure using a digital sphygmomanometer. Furthermore, it aimed to investigate the association between BMI and hypertension. The participants' ages ranged from 18 to 20 years.

The notion of Inclusion-Exclusion Standards: The study included female participants aged 18 to 20. The study excluded individuals who had already received a diagnosis of hypertension.

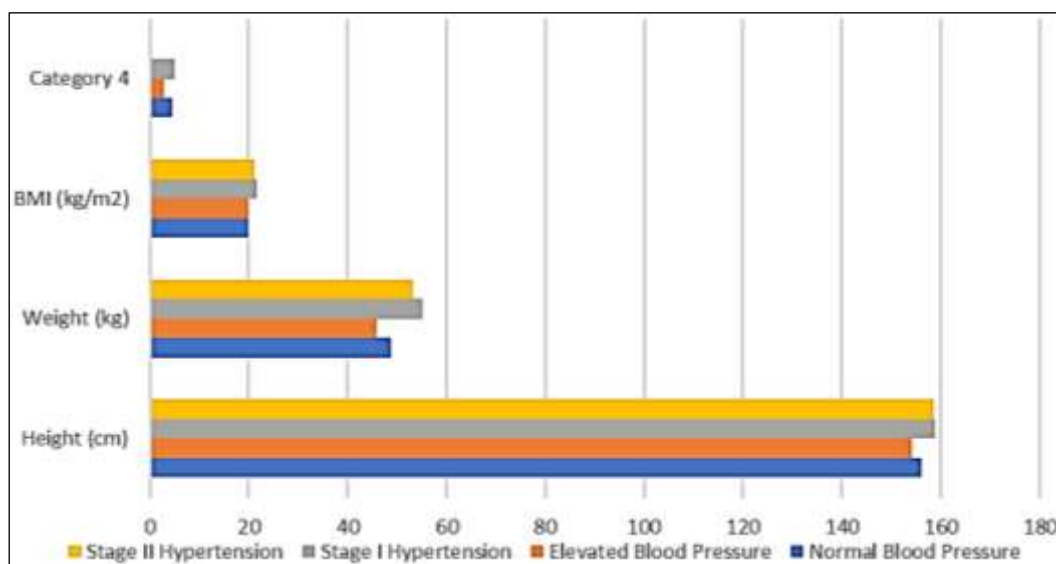
Data was collected via a questionnaire. Before asking any questions to the participants, the purpose of the study was explained and their written consent was obtained. The questionnaire included questions about fundamental details, anthropometric measures, and blood pressure evaluations. The questionnaire also included inquiries regarding physical exercise.

Blood pressure was measured using a digital sphygmomanometer. The blood pressure (BP) was classified based on the recommendations outlined by the American College of Cardiology and American Heart Association Task Force. Table 2 presents the classification of blood pressure.

Results

Table 1: Blood pressure

Category	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)	Frequency
Normal blood pressure	<120	<80	121
Elevated blood pressure	120-129	<80	20
Hypertension stage 1	130 – 139	80-89	07
Hypertension stage 2	≥140	≥90	02



Graph 1: BMI and Hypertension

Discussion

Previous studies have established a decrease in the percentage of females classified as obese or overweight. A cross-sectional study conducted in Wardha revealed that more than 50% of the female participants had an average BMI of 18.8 ± 6.08 kg/m², whereas only 5.2% were categorised as obese [17]. Similarly, a study carried out in Hyderabad revealed that a notably less percentage of females who were overweight (9.38%) and obese (2.60%) were observed in comparison to the present study. Jain *et al.* conducted a study in Central India and achieved identical results in a sample of 196 females between the ages of 17 and 26. Their findings indicated that the rate of overweight was 8%, while the rate of obesity was 11.3%. In contrast, a research conducted in Punjab on 123 females between the ages of 18 and 50 revealed a notable occurrence of obesity, with 22% of the subjects classified as obese [20]. These data indicate a gradual increase in obesity over a period of time.

This study also illustrates the existence of a twofold burden of malnutrition. The present population has a substantial percentage of underweight females (36%), along with 26% of youths who are categorised as overweight and obese. Therefore, this study provides evidence of a simultaneous occurrence of malnutrition in both undernourishment and over nourishment among the adolescent subjects. Simultaneously experiencing both undernutrition and overnutrition increases the probability of getting chronic ailments such as hypertension, diabetes, and cardiovascular disease [21]. Individuals who are underweight may experience a compromised immune system, rendering them more vulnerable to infections [22]. Urban girls may suffer from undernutrition due to insufficient dietary habits, resulting in a deficiency of healthy and balanced meals. A considerable proportion of girls who are overweight maintain a sedentary lifestyle and consume a substantial amount of unhealthy foods. Hence, as a result of various factors, the incidence of dual malnutrition is increasing in India.

Hypertension has increased among younger age groups as well. A survey was done to ascertain the prevalence of hypertension (HT) among adolescents in Karnataka. Their

research revealed that 19.4% of the 748 individuals between the ages of 11 and 19 had a familial history of hypertension (HT). Furthermore, they noted a significant correlation between a familial history of hypertension and those with elevated blood pressure ^[9]. The study conducted in Lucknow revealed that 24.2% of the 1041 participants had hypertension ^[23]. The research carried out in Uttar Pradesh revealed that 23.47% of the participants had a familial predisposition to hypertension ^[24]. In a study conducted in Assam, it was noted that 96 out of 800 subjects exhibited hypertension ^[25]. Among the 958 females aged 6-16 years in the Wardha research, 63 were diagnosed with hypertension and 67 were diagnosed with pre-hypertension ^[26].

BMI is a useful metric for evaluating nutritional status, particularly with reference to excessive weight or obesity. Obesity is a causative element in the onset of hypertension. It hinders the creation of nitric oxide, which is essential for the widening of blood vessels. Increased body weight results in heightened impedance to blood circulation within the body. Furthermore, it activates the renin angiotensin system and promotes the production of renin, aldosterone, and angiotensinogen, leading to increased blood pressure. A higher body mass index (BMI) is linked to a greater probability of having raised systolic blood pressure (SBP) and diastolic blood pressure (DBP) ^[27].

Teenagers have a higher prevalence of obesity ^[28]. Obesity stems from a disparity between energy intake and energy expenditure. Obesity can arise due to unhealthy eating patterns, including inadequate food selection, excessive intake of sugary sodas and carbonated drinks, bigger servings, and decreased physical activity. Childhood and adolescent obesity significantly increases the risk of non-communicable diseases. Adolescents can decrease their blood pressure by participating in weight loss, engaging in consistent physical exercise, and decreasing their consumption of salt ^[29].

Several studies have observed a strong association between being overweight or obese and the occurrence of hypertension. The study conducted in Haryana revealed a robust correlation between BMI and both systolic and diastolic blood pressure. Among the 1080 patients included in the study, 18.6% were found to have hypertension ^[30]. A cross-sectional study conducted in Berhampur indicated that most participants had normal blood pressure, but just 3.68% were diagnosed with hypertension. However, a significant association between hormone therapy (HT) and obesity was found ^[13]. Moreover, a study conducted on a sample of 965 individuals below the age of 30 revealed that 59.2% of the participants exhibited hypertension. Additionally, a notable association was observed between body mass index (BMI) and hypertension ^[31]. An investigation carried out in Karnataka on a cohort of 1152 youthful individuals unveiled that 45.2% of them had pre-hypertension. Moreover, the study revealed a direct association between body mass index (BMI) and the probability of getting hypertension.

Conclusion

Following a healthy diet and participating in regular exercise are essential for reducing the risk of obesity and hypertension in young adult females.

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