

**Original research article**

# **A Study of obesity and other clinical conditions due to obesity in school going children in Mangalore**

**<sup>1</sup>Dr. Gilbert Mendonca, <sup>2</sup>Dr. Alaka KS**

<sup>1-4</sup>Assistant Professor, Department of Medicine, AJ Institute of Medical Sciences, Mangalore, Karnataka, India

**Corresponding Author:**  
Dr. Alaka KS

## **Abstract**

The prevalence of obesity and hypertension among young adults and adolescents in India is increasing at an alarming rate. It is believed that changes in eating habits, such as an increase in the intake of processed foods, as well as a lack of physical activity, are responsible for the expansion of this problem. A hypertensive condition that first manifests itself during infancy or adolescent continues into adulthood. This research was conducted with the intention of determining the prevalence of obesity and hypertension in children who were between the ages of 5 and 16 years old.

**Keywords:** Hypertension, Obesity, Children, School.

## **Introduction**

There was an increase in the number of cases of hypertension in India, as indicated by the statistics from the Global Burden of Disease report for the year 2015 <sup>[1]</sup>. A prediction was made that by the year 2020, there will be a 111% increase in the number of deaths that are caused by cardiovascular disease in India <sup>[2]</sup>. "Silent killer" is a term that is occasionally used to describe hypertension because the majority of people who have hypertension do not exhibit any evident symptoms. The symptoms of hypertension include headaches, shortness of breath, dizziness, chest pain, and irregular heartbeats. People who have hypertension frequently experience these symptoms. Because there are no obvious indications or symptoms, hypertension can develop during childhood and adolescence, but it may go unrecognized because there are no obvious signs or symptoms <sup>[3,4]</sup>.

It has been found that obesity is related with hypertension in adolescents of Asian descent <sup>[5]</sup>. There has been a change in eating patterns and a decrease in the amount of physical activity that people are engaging in all across the world during the past two decades <sup>[6]</sup>. When it comes to lowering hypertension in adolescents, it is widely believed that engaging in physical exercise is absolutely necessary. The World Health Organization (WHO) suggests that persons between the ages of 18 and 64 should engage in physical exercise for a duration of thirty minutes, five days per week, in order to reduce the likelihood of developing non-communicable diseases <sup>[7-16]</sup>.

It has been observed that the prevalence of hypertension among adolescents and preadolescents has been on the rise <sup>[8]</sup>. This phenomenon can be ascribed to the rise in obesity, which stems from altered dietary preferences and lower levels of physical exercise <sup>[9, 9]</sup> This phenomenon can be attributed to the rise in obesity. One of the findings from a study that was carried out on children who have been diagnosed with HT is presented in Table 1. According to the findings of the studies, the prevalence of pre-hypertension and hypertension among young children and adolescents has been on the rise, with the incidence rising from 8.5% in 2006 to 20.2% in 2017. This study was conducted with the intention of determining the prevalence of obesity and hypertension among children who are enrolled in school.

## **Materials and Methods**

The research was carried out utilising a cross-sectional methodology and involved a cohort 900 children. 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 5 to 16 years.

The notion of Inclusion-Exclusion Standards: The study excluded individuals who had already received a diagnosis of hypertension.

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.

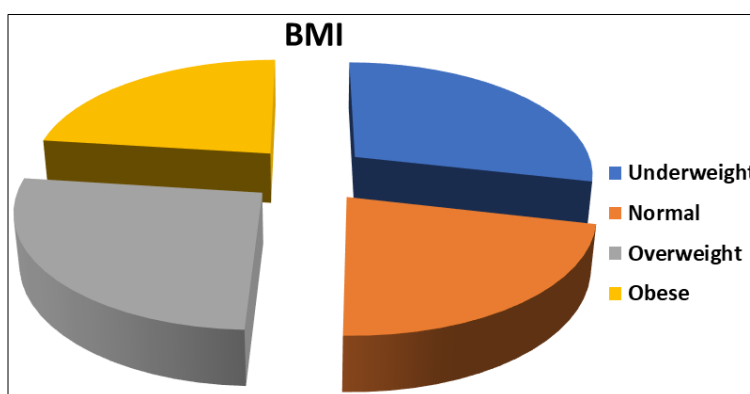
Results

Table 1: Blood pressure

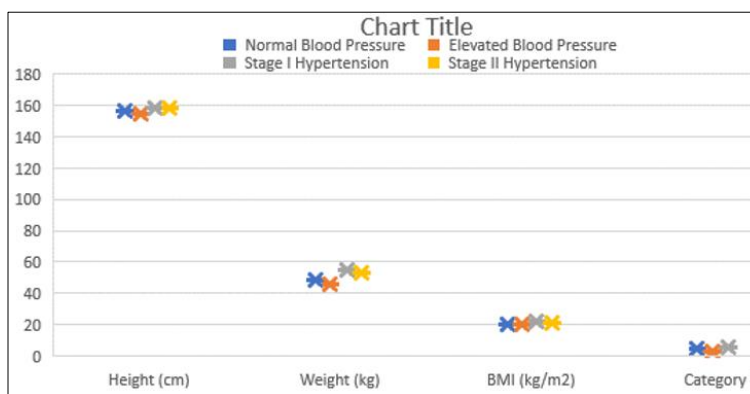
Category	Systolic Blood Pressure(mmHg)	Diastolic Blood Pressure(mmHg)	Frequency
Normalbloodpressure	<120	<80	811
Elevatedbloodpressure	120-129	<80	46
Hypertensionstage1	130 – 139	80-89	26
Hypertensionstage2	≥140	≥90	17

Table 2: BMI Category

BMI Category	Number of Subjects
Underweight	257
Normal	198
Overweight	238
Obese	207
Total	900



Graph 1: BMI



Graph 2: BMI and Hypertension

Discussion

Studies conducted in the past have demonstrated that there has been a decline in the proportion of females who are classed as obese or overweight. According to the findings of a cross-sectional study carried out in Wardha, it was discovered that more than fifty percent of the female participants had a body mass index (BMI) of  $18.8 \pm 6.08$  kg/m<sup>2</sup>, yet only five percent of them were classified as obese [17]. In a similar vein, a study that was conducted in Hyderabad found that the percentage of females who were overweight (9.38%) and obese (2.60%) was significantly lower than what was observed in the present study. An investigation was carried out by Jain and colleagues in Central India, and they obtained the same findings from a group of 196 females ranging in age from 17 to 26 years old. According to their findings, the percentage of people who were overweight was 8%, while the percentage of people who were obese was 11.3%. On the other hand, a study that was carried out in Punjab on 123 females between the ages of 18 and 50 indicated a significant prevalence of obesity, with 22% of the respondents being categorised as obese [20]. The data presented here point to a progressive rise in the prevalence of obesity over a period of time.

In addition, this study demonstrates that the burden of malnutrition is comprised of two distinct aspects. In the current population, there is a sizeable proportion of females who are underweight, which accounts

for 36% of the total, and there are also 26% of young people who are classified as being overweight or obese. Consequently, the findings of this study give evidence that malnutrition can occur simultaneously in the form of both undernourishment and over nourishment among the groups of adolescents who participated in the study. The likelihood of developing chronic conditions such as hypertension, diabetes, and cardiovascular disease is increased when an individual simultaneously experiences both undernutrition and overnutrition<sup>[21]</sup>. It is possible for individuals who are underweight to have an impaired immune system, which makes them more susceptible to illnesses<sup>[22]</sup>. There is a possibility that urban girls would suffer from undernutrition as a consequence of inadequate dietary habits, which will lead to a lack of nutritious and well-balanced meals. Girls who are overweight tend to lead sedentary lifestyles and consume a significant amount of unhealthy meals. This is the case for a sizeable number of the girls who are overweight. Because of this, the prevalence of dual malnutrition is growing in India as a consequence of a number of different variables' contributions.

It has also been observed that hypertension has increased among younger age groups. In order to determine the extent to which hypertension (HT) is prevalent among teenagers in the state of Karnataka, a survey was conducted. Nineteen percent of the 748 people who were between the ages of 11 and 19 were found to have a family history of hypertension (HT), according to the findings of their research. In addition to this, they found that there was a strong association between individuals who had elevated blood pressure and those who had a history of hypertension in their family<sup>[9]</sup>. According to the findings of the research carried out in Lucknow, 24.2% of the 1041 participants were diagnosed with hypertension<sup>[23]</sup>. It was discovered through the research that was conducted in Uttar Pradesh that 23.47 percent of the individuals who took part in the study had a family history of hypertension<sup>[24]</sup>. The results of a study that was carried out in the state of Assam revealed that hypertension was present in 96 out of 800 participants<sup>[25]</sup>. It was determined that 63 of the 958 females aged 6 to 16 years who participated in the Wardha investigation had been diagnosed with hypertension, while 67 of them had been diagnosed with pre-hypertension<sup>[26]</sup>.

The body mass index (BMI) is a valuable tool for evaluating nutritional status, particularly in relation to conditions such as obesity or excessive weight. When it comes to the beginning of hypertension, obesity is a factor that can cause it. It prevents the production of nitric oxide, which is necessary for the expansion of blood vessels and is inhibited by this substance. There is a correlation between increased body weight and an increase in the impedance to blood circulation within the body. In addition to this, it stimulates the renin-angiotensin system and encourages the creation of renin, aldosterone, and angiotensinogen, which ultimately results in an increase in blood pressure. There is a correlation between having a higher body mass index (BMI) and having a higher likelihood of having elevated systolic blood pressure (SBP) and diastolic blood pressure (DBP)<sup>[27]</sup>.

Obesity is more prevalent among adolescents than it is among adults<sup>[28]</sup>. Obesity is caused by a mismatch between the amount of energy that is consumed and the amount that is expended. Inadequate food choices, excessive consumption of sugary sodas and carbonated drinks, larger serving sizes, and decreased physical activity are all factors that can contribute to obesity. A number of bad eating patterns can also contribute to obesity. Obesity in children and adolescents is associated with a large increase in the risk of noncommunication-related disorders. It is possible for adolescents to lower their blood pressure by taking part in weight reduction programmes, engaging in regular physical activity, and reducing the amount of salt they consume<sup>[29]</sup>.

According to the findings of a number of research, there is a significant correlation between being overweight or obese and the possibility of developing hypertension. According to the findings of the research carried out in Haryana, there is a strong connection between body mass index (BMI) and both systolic and diastolic blood pressure. The study comprised a total of 1080 participants, and it was discovered that 18.6% of those patients had hypertension<sup>[30]</sup>. Only 3.68 percent of the participants in a cross-sectional study that was carried out in Berhampur were diagnosed with hypertension, despite the fact that the majority of the individuals had normal blood pressure. On the other hand, a strong correlation between hormone therapy (HT) and obesity was discovered<sup>[13]</sup>. Furthermore, a study that was carried out on a group of 965 people who were under the age of 30 indicated that 59.2% of the participants displayed hypertension. To add insult to injury, a significant correlation was found between body mass index (BMI) and hypertension<sup>[31, 32]</sup>. According to the findings of a study that was conducted in Karnataka on a group of 1152 young people, 45.2% of them were found to have pre-hypertension. In addition, the research showed that there is a direct connection between the body mass index (BMI) and the likelihood of developing hypertension.

### **Conclusion**

Following a nutritious diet and engaging in regular physical activity are two of the most important things that young may do to lower their chances of developing obesity and hypertension.

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