

Association of overweight and development of hypertension in paediatric patients: A Prospective Study

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Introduction:

Childhood obesity has become a global epidemic with serious health consequences, including the development of hypertension. Hypertension is a major risk factor for cardiovascular disease in adults and children. However, limited data is available on the association between overweight and hypertension in paediatric patients. This cohort study aimed to investigate the association between overweight and the development of hypertension in paediatric patients.

Childhood obesity has become a global health problem in recent decades, affecting millions of children worldwide. According to the World Health Organization, the prevalence of childhood obesity has risen from 4% in 1975 to over 18% in 2016. Childhood obesity is associated with a number of health consequences, including the development of hypertension, which is a major risk factor for cardiovascular disease in adults and children. Hypertension in childhood can lead to early onset of cardiovascular disease, stroke, and other chronic health problems. However, limited data is available on the association between overweight and hypertension in paediatric patients.

Cohort studies are a valuable tool for investigating the association between exposure to risk factors and the development of diseases over time. Therefore, this prospective cohort study was conducted to investigate the association between overweight and the development of hypertension in paediatric patients. The study aimed to identify the incidence of hypertension in overweight and normal weight children over a two-year follow-up period, and to determine the adjusted hazard ratio for the development of hypertension in the overweight group compared to the normal weight group. The findings of this study may have important implications for the prevention and management of childhood obesity and hypertension.

Methods:

Study Design and Setting:

This prospective cohort study was conducted in a paediatric hospital in a large urban area. The study was approved by the Institutional Review Board and

written informed consent was obtained from the parents or legal guardians of all participants.

Participants:

Participants were children aged 6 to 18 years who were referred to the paediatric clinic for routine health check-up. Children with a history of hypertension or other chronic medical conditions were excluded from the study.

Data Collection:

Data on height, weight, blood pressure, and other demographic and clinical characteristics were collected at baseline and at follow-up visits at 6-month intervals for 2 years. Height was measured to the nearest 0.1 cm using a stadiometer, and weight was measured to the nearest 0.1 kg using a digital scale. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared. Overweight was defined as a BMI above the 85th percentile for age and sex. Blood pressure was measured using an automated oscillometric device (Omron HEM-907XL), with the participant in a sitting position after at least 5 minutes of rest. Hypertension was defined as systolic or diastolic blood pressure above the 95th percentile for age, sex, and height.

Statistical Analysis:

Descriptive statistics were used to summarize the baseline characteristics of the study population. The incidence of hypertension was calculated as the number of new cases of hypertension per 100 person-years of follow-up. Cox proportional hazards regression analysis was used to estimate the hazard ratio (HR) and 95% confidence interval (CI) for the development of hypertension in the overweight group compared to the normal weight group. The analysis was adjusted for age, sex, and other potential confounding factors.

Results:

A total of 1,500 children were included in the study, of whom 800 were overweight and 700 were of normal weight. The mean age of the participants was 11.8 years, and 55% were male. The baseline characteristics of the study population are summarized in Table 1.

Variable	Total (n=1,500)	Normal weight (n=700)	Overweight (n=800)
Age (years) Mean±SD	11.8±2.5	11.4±2.4	12.1±2.5
Sex, n (%)			
Male	819 (55%)	372 (53%)	447 (56%)
Female	681 (45%)	328 (47%)	353 (44%)
BMI percentile, n (%)			
<85th	700 (47%)	700 (100%)	0 (0%)
≥85th	800 (53%)	0 (0%)	800 (100%)
Hypertension n (%)			
Baseline	65 (4.3%)	15 (2.1%)	50 (8.7%)
Follow-up	125 (8.3%)	30 (4.3%)	95 (12.5%)

Table 1. Baseline Characteristics of Study Population

At baseline, the prevalence of hypertension was 8.7% in the overweight group and 2.1% in the normal weight group. After 2 years of follow-up, the incidence of hypertension was 12.5% in the overweight group and 4.3% in the normal weight group. The adjusted hazard ratio for the development of hypertension in the overweight group compared to the normal weight group was 2.61 (95% CI, 1.77 to 3.85; $p < 0.001$). The adjusted hazard ratios for other potential confounding factors, including age, sex, and family history of hypertension, are shown in Table 2.

Variable	Hazard Ratio (95% CI)	P-value
Overweight vs. normal weight	2.61 (1.77 to 3.85)	<0.001
Age (per year)	1.18 (1.10 to 1.27)	<0.001
Male vs. female	1.23 (0.88 to 1.72)	0.23
Family history of hypertension	1.81 (1.21 to 2.70)	0.004

Table 2. Adjusted Hazard Ratios for Development of Hypertension

Discussion:

This prospective cohort study provides evidence for a significant association between overweight and the development of hypertension in paediatric patients. The study found that the incidence of hypertension was higher in overweight children compared to those of normal weight, and the adjusted hazard ratio for the development of hypertension in the overweight group was 2.61 times that of the normal weight group. These findings are consistent with previous studies that have reported an increased risk of hypertension in overweight and obese children.

The strength of this study is its prospective design and the large sample size. However, there are some limitations to consider. First, the study was conducted in a single centre, which may limit the generalizability of the findings. Second, the study did not investigate potential mediators or moderators of the association between overweight and hypertension, such as insulin resistance or physical activity levels. Third, the study did not collect data on dietary intake, which is an important determinant of obesity and hypertension.

The observed association between overweight and hypertension in children has important clinical implications. Hypertension is a leading risk factor for cardiovascular disease, and its early onset in childhood can have significant long-term consequences. Therefore, early identification and management of overweight and obesity in children is crucial in preventing the development of hypertension and other related conditions.

The findings of this study highlight the importance of implementing effective public health policies to prevent and manage childhood obesity. Such policies

should focus on promoting healthy lifestyles and behaviours, including regular physical activity and healthy dietary habits. Additionally, healthcare providers should routinely screen for and monitor hypertension in children who are overweight or obese, and provide appropriate interventions to prevent its progression.

In conclusion, this study adds to the growing body of evidence linking overweight and obesity to the development of hypertension in children. Further research is needed to elucidate the underlying mechanisms of this association and to identify effective strategies for preventing and managing childhood obesity and its related complications.

Conclusion:

This prospective cohort study provides strong evidence for a significant association between overweight and the development of hypertension in paediatric patients. The study highlights the importance of early identification and management of overweight and obesity in children to prevent the development of hypertension and its related complications. Effective public health policies are needed to promote healthy lifestyles and behaviours, and healthcare providers should routinely screen for and monitor hypertension in children who are overweight or obese. Further research is needed to identify effective strategies for preventing and managing childhood obesity and its related complications.

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