

Prehypertension In Adolescent Children

Introduction: High blood pressure (BP) in children and adolescents is becoming one of the most common health conditions worldwide and is much more widely prevalent than previously thought.¹ Prehypertension is a state of transition between normal blood pressure and hypertension. Adolescent Prehypertension is a strong predictor of hypertension in adults and is now considered for cardiovascular intervention or risk reduction.² Over subsequent years the theory on childhood origins of hypertension has been supported by a substantial body of epidemiologic data that link higher BP levels in childhood with early onset hypertension in adulthood.³ Hypertension is a prevalent cardiovascular disease risk factor among blacks and adolescent hypertension can progress into adulthood.⁴ The combination of high BP and obesity in adolescents appears to amplify the risk for cardiac pathology.⁵ High blood pressure is a risk factor for some disease like stroke, coronary heart disease, and renal failure. High blood pressure in children is an increasing health problem.⁶ The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, with Treatment of High Blood Pressure (JNC-7) has defined hypertension as systolic blood pressure (BP) ≥ 140 mmHg or diastolic BP ≥ 90 mmHg. Whereas the JNC-7 defines 'Prehypertension' to include systolic BP values ranging between 120 and 139 mmHg and diastolic BP values between 80 and 89 mmHg.⁷ There is little information in paediatrics on the persistence of the Prehypertension and hypertension classifications or on the progression of Prehypertension to hypertension. The data on the prevalence of Prehypertension and hypertension in children show large regional differences in India and such data are not available from India. Hence this study was conducted.

Background: In the 2004 report from the National High Blood Pressure (BP) Education Program Working Group on BP in Children and Adolescents, the term "high normal BP" was replaced with new term "Prehypertension". It included BP levels that were higher than normal but less than the level of hypertension posed an increased risk for progression to hypertension. The overall intent of this description was to help identify children who were at the greatest risk for the development of hypertension.⁵ The BP tracking phenomenon was confirmed by Chen and Wang in their meta-analysis on 50 published cohort studies, representing diverse populations. Their analysis demonstrated an overall average tracking coefficient of 0.38 for systolic BP, thus confirming the observation that higher BP levels in childhood are associated with higher BP levels in young adulthood.⁸ The prevalence of persistent Prehypertension was 4.0%.⁹ A study of 2694 adolescents in the age group of 10-18 years in Enugu metropolis was carried out. Socio-demographic profile anthropometric and blood pressure readings were measured. Derived measurements such as Prehypertension, hypertension and BMI were calculated. The results showed that the mean systolic blood pressure and diastolic blood pressure for males were 106.66 + 11.80 mmHg and 70.25 + 7.34 mmHg respectively. The mean SBP and DBP for females were 109.83 + 11.66 mmHg and 72.23 + 8.26 mmHg respectively ($p < 0.01$). Blood pressure was found to increase with age. Prevalence of hypertension and Prehypertension was 5.4% and 17.3% respectively with a higher rate in females (6.9%) than males (3.8%). Prevalence of Prehypertension among males and females were 14.3% and 20.1% respectively. The prevalence of obesity was 1.9%.⁴ Descriptive analytic study was conducted by using a multiphase sampling method in Ahvaz (Southwest of Iran). Each participant was examined and a questionnaire include: height, weight, and body mass index, systolic ,diastolic blood pressures was filled. Blood pressure was measured twice for each person. For the diagnosis of hypertension, the fourth report of the Diagnosis, Evaluation, and Treatment of High Blood

Pressure in Children and Adolescents of the National Health Institute of United States was used. The prevalence of pre-hypertension was 9% (7.6% in boys, 10.6% in girls). The mean systolic and diastolic blood pressures increased with increasing body mass index. The prevalence of high blood pressure was found to be lower than other studies in our country. The prevalence of the high blood pressure in boys was significantly higher than girls.⁸

Literature review: The clinical evaluation of high BP is usually based on BP measurements obtained in an office or clinic setting where the preferred method of measurement is by auscultation. The mean of 3 BP measurements determined each student's BP status per visit, with upto 3 visits was obtained. Final BP status was classified as normal (BP <90th percentile and 120/80 mm Hg at the first visit), variable (BP \geq 90th percentile or 120/80 mm Hg at the first visit and subsequently normal), abnormal (BP \geq 90th percentile or 120/80 mm Hg at 3 visits but not hypertensive), or hypertensive (BP \geq 95th percentile at 3 visits). The abnormal group included those with persistent Prehypertension (BP \geq 90th percentile or 120/80 mm Hg and <95th percentile on 3 visits).⁴ The Asia Pacific Cohort Studies Collaboration is an individual participant data overview of cohort studies in the region. This analysis included a total of 346570 participants from 36 cohort studies. Outcomes were fatal and nonfatal CVD. The relationship between BP categories and CVD was explored using a Cox proportional hazards model adjusted for age, cholesterol, and smoking and stratified by sex and study. Compared with normal BP (<120/80 mmHg), hazard ratios (95% CIs) for CVD were 1.41 (1.31-1.53) for Prehypertension, 1.81 (1.61-2.04) for IDH, 2.18 (2.00-2.37) for isolated systolic hypertension, and 3.42 (3.17-3.70) for systolic-diastolic hypertension. Separately significant effects of Prehypertension and hypertension subtypes were also observed for coronary heart disease, ischemic stroke, and haemorrhagic stroke. In the Asia-Pacific region, Prehypertension and all hypertension subtypes, including IDH, thus clearly predicted increased risks of CVD.¹² A cross-sectional survey of 15,296 participants (15 years or older) was conducted in Jiangxi Province, China, in 2013, using questionnaire forms and physical measurements. The prevalence of Prehypertension and hypertension was 32.3% (39.2% in men and 27.6% in women) and 29.0% (30.1% in men and 28.2% in women), respectively. The awareness, treatment, and control rates among all hypertensive participants were 64.8%, 27.1%, and 12.6%, respectively. The prevalence of Prehypertension in males declined with age, but the prevalence of hypertension increased in different genders. The prevalence of Prehypertension and hypertension increased with increasing body mass index (BMI). The prevalence of Prehypertension decreased, in parallel to an increase in the prevalence of hypertension, with increasing waist circumference (WC).¹³ Multiple linear regression analysis was used to find out the determinants of hypertension in these children. Prehypertension was detected in 6.9% and 6.5% and hypertension was found in 6.8% and 7.0% of boys and girls, respectively.¹⁴

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