

Original Research Article

BLOOD PRESSURE TO HEIGHT RATIO AS A SCREENING TOOL FOR HYPERTENSION IN SCHOOL CHILDREN OF AGE GROUP BETWEEN 6 TO 17 YEARSR.Rathiga¹, S.Nanthakumar², Revathi M³

Received : 29/08/2026
 Received in revised form : 22/09/2026
 Accepted : 06/10/2026

Keywords:

Blood pressure-to-height ratio,
 Hypertension, Prehypertension,
 Children, Blood pressure screening.

Corresponding Author:

Dr. R. Rathiga,

Email: sweet.rathiga@gmail.com

DOI: 10.47009/jamp.2026.8.5.119

Source of Support: Nil,
 Conflict of Interest: None declared

Int J Acad Med Pharm
 2026; 8 (5); 757-762



¹Assistant Professor, Department of Paediatrics, Government Namakkal Medical College, Tamilnadu, India

²Senior Resident, Department of Paediatrics, Government Namakkal Medical College, Tamilnadu, India

³Assistant Professor, Department of Paediatrics, Government Namakkal Medical College, Tamilnadu, India

ABSTRACT

Background: Childhood hypertension is an increasing public health concern because elevated blood pressure tracks into adulthood and contributes to future cardiovascular diseases. This study aimed to simplify paediatric blood pressure percentile references using the blood pressure-to-height ratio to screen for prehypertension and hypertension in Indian children. **Materials and Methods:** A cross-sectional study was conducted among 1,020 school-going children aged 6-17 years who attended urban government schools in Chennai from October 2016 to September 2017. Blood pressure, height, weight, and body mass index were measured using standardised procedures. Blood pressure-to-height ratios were calculated, and the diagnostic performance was evaluated against conventional blood pressure percentile classifications for hypertension and prehypertension. **Result:** The mean age was 11.93 ± 3.46 years, and 521 (51.1%) patients were males. Hypertension was identified in 57 (5.59%) patients, including systolic hypertension in 29 (2.8%) and diastolic hypertension in 52 (5.09%), while prehypertension occurred in 90 (8.82%) patients, including systolic prehypertension in 49 (4.80%) and diastolic prehypertension in 84 (8.23%) patients. Blood pressure-to-height ratio demonstrated strong correlations with blood pressure percentiles ($R=0.825$ systolic; $R=0.776$ diastolic; $p<0.001$). Receiver operating characteristic analysis showed excellent diagnostic performance with high sensitivity, specificity, and sex-independent optimal threshold values. **Conclusion:** Blood pressure-to-height ratio is a simple, reliable, sex-independent screening tool for the early identification of paediatric prehypertension and hypertension.

INTRODUCTION

Hypertension is a major preventable cause of illness and death worldwide and remains an important public health problem. Although it has been considered an adult disease, evidence now shows that high blood pressure (BP) often begins during childhood, making paediatric hypertension an early predictor of future cardiovascular disease. Childhood hypertension has become more common, mainly because of increasing obesity, unhealthy eating habits, reduced physical activity, and urbanisation.^[1,2] Studies have shown that children with elevated BP are more likely to remain hypertensive as adults.^[3-5] Childhood hypertension has also been linked with early target organ damage and a higher risk of cardiovascular complications such as stroke and heart failure later in life.^[6,7]

The burden of elevated BP among children and adolescents continues to increase worldwide. In India, systematic reviews have reported a pooled prevalence of hypertension of approximately 7.6% among adolescents, although the rates differ across regions.^[8,9] School-based studies have also shown a considerable prevalence of prehypertension and hypertension, particularly in urban areas, where lifestyle and environmental factors play a major role.^[10,11] Factors such as obesity, unhealthy diet, physical inactivity, higher socioeconomic status, and family history are known contributors to elevated BP in Indian children.^[8,11] Since childhood hypertension is usually asymptomatic, school screening programmes provide a valuable opportunity for early identification and intervention.^[9] However, diagnosis remains difficult because BP measurements vary and

the current diagnostic system is complex and not always easy to use in routine practice.^[12]

Current international guidelines diagnose paediatric hypertension using BP percentiles based on age, sex, and height. Although these standards account for normal growth-related changes, they require multiple reference charts and calculations, making them difficult to use in busy outpatient clinics, primary healthcare centres, and school health programmes. Childhood hypertension is often overlooked, despite its known association with adult cardiovascular diseases.^[1,2] This has increased interest in simpler screening methods that can maintain good diagnostic accuracy while being easier to apply in routine practice.^[5]

One such method is the blood pressure-to-height ratio (BPHR). By relating BP to height, BPHR removes the need for age-, sex-, and height-specific percentile charts. Because height strongly influences BP during growth, BPHR provides a simple yet clinically meaningful approach for screening.^[13] It is particularly useful for school health programmes, primary care, and resource-limited settings where rapid assessment is needed.

Previous studies have shown that both systolic and diastolic BPHR have high sensitivity and acceptable specificity for identifying elevated BP in children, making it a practical alternative to conventional BP percentile methods.^[1,14,15] Most studies have been conducted outside India, and differences in growth, body composition, nutrition, and BP patterns may affect the applicability of existing BPHR cut-off values.^[11,15] Evidence on the use of BPHR for screening both prehypertension and hypertension in Indian children is limited. Therefore, this study evaluated the diagnostic performance of systolic and diastolic BPHR against conventional BP percentile standards and determined suitable screening thresholds for Indian children.

Aim: This study aimed to simplify the paediatric blood pressure percentile references using the blood pressure-to-height ratio for prehypertension and hypertension screening in Indian children.

MATERIALS AND METHODS

This cross-sectional study was conducted among school-going children attending urban government schools in Chennai under the ICH School Health Programme from October 2016 to September 2017. Ethical approval was obtained from the Institutional Ethics Committee before commencement of the study. Written informed consent was obtained from the parents or guardians of all participants prior to enrolment.

Inclusion and Exclusion Criteria: The study included apparently healthy school-going children of either sex aged 6–17 years studying in government schools under the ICH School Health Programme in Chennai. Children with any major medical or surgical illness, chronic cardiac, renal, or hepatic disease,

acute infections, hypertension secondary to medications, dyslipidaemia, or any history of trauma within the preceding two weeks were excluded from the study.

Materials: The materials used in the study included a calibrated mercury sphygmomanometer, appropriately sized blood pressure cuffs, a stadiometer for height measurements, a calibrated electronic weighing scale, and standardised data collection forms.

Methods: Children were recruited from urban government schools participating in the ICH School Health Programme. Demographic information, including age and sex, was obtained from the students' school records. All children underwent clinical examination and anthropometric assessment. Height and weight were measured using standard procedures, and the body mass index (BMI) was calculated. Before BP measurement, the procedure was explained to the participants to reduce anxiety and ensure cooperation. BP was measured at the end of the examination in a quiet and relaxed setting. Children were asked to empty their bladders before the measurement, and femoral artery pulsation was routinely checked to exclude coarctation of the aorta. Blood pressure was measured using the auscultatory method with a calibrated mercury sphygmomanometer, following the recommendations of the National High Blood Pressure Education Program Working Group.

Measurements were taken with the child seated comfortably, back supported, feet flat on the floor, and the right arm supported at the heart level. An appropriately sized cuff with a bladder width of approximately 40% of the mid-arm circumference was used for each participant. Systolic BP was recorded at the first Korotkoff sound (Phase I), and diastolic BP was recorded at the disappearance of the fifth Korotkoff sound (Phase V). Three readings were obtained, and the average of the last two readings was used for analysis. Height was measured barefoot using a stadiometer to the nearest 0.1 cm, and weight was recorded to the nearest 0.5 kg using a calibrated electronic scale. Hypertension was classified according to age-, sex-, and height-specific BP percentiles. The blood pressure-to-height ratios were calculated by dividing the systolic and diastolic BP by height in centimetres.

Statistical analysis: Data were presented as mean, standard deviation, frequency and percentage. The correlation between continuous variables was assessed using Pearson's correlation test. Receiver operating characteristic (ROC) curve analysis was performed to determine the diagnostic accuracy of the screening tests. The optimal cutoff values were calculated using the Youden index. Cross-tabulation analysis was performed to determine the sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (LR+), negative likelihood ratio (LR-), and area under the receiver operating characteristic curve (AUC). Significance was defined by P values less

than 0.05 using a two-tailed test. Data analysis was performed using IBM-SPSS version 21.0 (IBM-SPSS Science Inc., Chicago, IL, USA).

RESULTS

The study included 1020 patients with a mean age of 11.93 ± 3.46 years and a median age of 11.92 years (IQR: 9.00-15.44). There were 521 (51.1%) males

and 499 (48.9%) females, with no significant difference in sex distribution ($P = 0.649$). Hypertension was identified in 57 (5.59%) patients, with diastolic hypertension occurring more often than systolic hypertension (52 [5.09%] vs. 29 [2.8%]), and 24 (2.35%) had both. Prehypertension was observed in 90 (8.82%) patients. Diastolic prehypertension was more frequent than systolic prehypertension (84 [8.23%] vs. 49 [4.80%]) [Table 1].

Table 1: Baseline demographic characteristics and prevalence of prehypertension and hypertension among the patients

		N (%)	P Value
Age (years)	Mean $\pm$ SD	11.93 $\pm$ 3.46	-
	Median (IQR)	11.92 (9.00-15.44)	
Sex	Male	521 (51.1%)	0.649
	Female	499 (48.9%)	
Hypertension	Systolic	29 (2.8%)	-
	Diastolic	52 (5.09%)	
	Either systolic, diastolic	57 (5.59%)	
	Both systolic and diastolic BP	24 (2.35%)	
Prehypertension	Systolic	49 (4.80%)	-
	Diastolic	84 (8.23%)	
	Either systolic, diastolic or both	90 (8.82%)	

A strong positive correlation was found between the blood pressure-to-height ratio and blood pressure percentile for both systolic and diastolic measurements. The correlation was stronger for systolic than for diastolic measurements ($R = 0.825$ vs. 0.776). The coefficient of determination was higher for systolic measurements ($R^2 = 0.6805$) than

for diastolic measurements ($R^2 = 0.6028$). The adjusted R^2 values were 0.6802 and 0.6024, respectively. The 95% confidence intervals were 0.804-0.844 for systolic and 0.751-0.800 for diastolic measurements, and were significant ($p < 0.001$) [Table 2 and Figure 1-2].

Table 2: Correlation between blood pressure-to-height ratio and blood pressure percentiles

	Systolic	Diastolic
Correlation coefficient (R)	0.825	0.776
95% Confidence interval	0.804-0.844	0.751-0.800
R^2	0.6805	0.6028
Adjusted R^2	0.6802	0.6024
p value	<0.001	<0.001

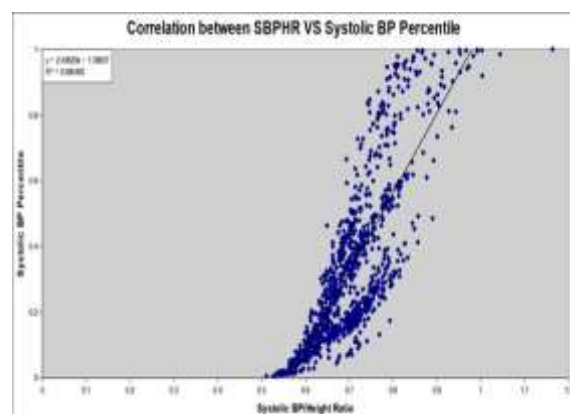


Figure 1: Correlation between systolic blood pressure-to-height ratio and systolic blood pressure percentile

For hypertension, the optimal cut-off values were 0.804 for systolic and 0.51 for diastolic measurements. Both achieved 100% sensitivity and 100% negative predictive value, with no false-negative cases. Systolic measurements performed better, with higher specificity (92% vs. 85%), positive predictive value (27.3% vs. 26.5%), positive likelihood ratio (12.88 vs. 6.72), fewer false positives

(77 vs. 144), and a higher Youden index (0.922 vs. 0.850) than diastolic measurements.

For prehypertension, the cutoffs were 0.78 (systolic) and 0.50 (diastolic). Systolic measurements showed higher sensitivity (100% vs. 96%), specificity (89% vs. 84%), negative predictive value (100% vs. 99.6%), positive likelihood ratio (9.51 vs. 6.05), fewer false positives (102 vs. 149), no false negatives (0 vs. 3), and a higher Youden index (0.890 vs. 0.810) [Table 3].

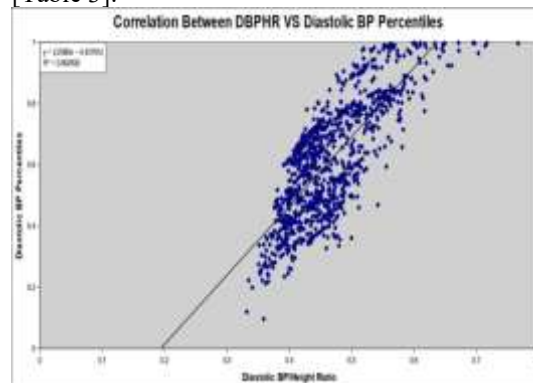


Figure 2: Correlation between diastolic blood pressure-to-height ratio and diastolic blood pressure percentile

Table 3: Diagnostic performance of blood pressure-to-height ratio for identifying hypertension and prehypertension

	Hypertension		Prehypertension	
	Systolic	Diastolic	Systolic	Diastolic
Threshold	0.804	0.51	0.78	0.5
Sensitivity (%)	100	100	100	96
Specificity (%)	92	85	89	84
PPV (%)	27.3	26.5	32.4	35.2
NPV (%)	100	100	100	99.6
LR+	12.88	6.72	9.51	6.05
LR-	0	0	0	0.04
False positives, n	77	144	102	149
False negatives, n	0	0	0	3
Youden index	0.922	0.85	0.89	0.81

For systolic hypertension, the cutoff was 0.80 in both sexes, with 100% sensitivity and 100% negative predictive value. Boys had higher specificity (93.5% vs. 91.0%), positive likelihood ratio (15.42 vs. 11.45), fewer false positives (33 vs. 42), and a higher Youden index (0.94 vs. 0.91), whereas girls had a slightly higher positive predictive value (30.0% vs. 26.6%) and AUC (0.98 vs. 0.97).

For diastolic hypertension, the cutoffs were 0.51 for boys and 0.54 for girls. Boys showed higher sensitivity (100% vs. 96.6%), whereas girls had higher specificity (89.3% vs. 87.0%), positive predictive value (36.7% vs. 26.5%), positive likelihood ratio (9.06 vs. 8.18), fewer false positives (9 vs. 61), and AUC (0.97 vs. 0.96) [Table 4].

Table 4: Sex-specific diagnostic performance of blood pressure-to-height ratio for identifying hypertension

	Hypertension			
	Systolic		Diastolic	
	Boys	Girls	Boys	Girls
Threshold	0.8	0.8	0.51	0.54
Sensitivity (%)	100	100	100	96.6
Specificity (%)	93.5	91	87	89.3
PPV (%)	26.6	30	26.5	36.7
NPV (%)	100	100	100	99.7
LR+	15.42	11.45	8.18	9.06
LR-	0	0	0	0.037
False positives	33	42	61	9
False negatives	0	0	0	0
Youden index	0.94	0.91	0.87	0.86
AUC	0.97	0.98	0.96	0.97

Sex-specific ROC analysis showed excellent performance of the blood pressure-to-height ratio for detecting prehypertension in both boys and girls. For systolic prehypertension, the cutoffs were 0.80 for boys and 0.78 for girls. Both had 100% sensitivity and 100% negative predictive value, with no false-negative cases. Boys showed higher specificity (95.3% vs. 87.4%), positive predictive value (48.8% vs. 32.1%), positive likelihood ratio (21.69 vs. 7.98),

fewer false positives (23 vs. 59), a higher Youden index (0.95 vs. 0.87), and a slightly higher AUC (0.98 vs. 0.97) than girls. For diastolic prehypertension, the cut-offs were 0.50 for boys and 0.51 for girls. Boys had slightly higher sensitivity (97% vs. 96%), specificity (84.1% vs. 84.0%), and AUC (0.95 vs. 0.93), whereas girls had higher positive predictive value (40.0% vs. 30.0%) and fewer false positives (72 vs. 77) [Table 5].

Table 5: Sex-specific diagnostic performance of blood pressure-to-height ratio for identifying prehypertension

	Prehypertension			
	Systolic		Diastolic	
	Boys	Girls	Boys	Girls
Threshold	0.8	0.78	0.5	0.51
Sensitivity (%)	100	100	97	96
Specificity (%)	95.3	87.4	84.1	84
PPV (%)	48.8	32.1	30	40
NPV (%)	100	100	99.7	99.4
LR+	21.69	7.98	6.13	5.98
LR-	0	0	0.034	0.047
False positives	23	59	77	72
False negatives	0	0	1	2
Youden index	0.95	0.87	0.81	0.799
AUC	0.98	0.97	0.95	0.93

DISCUSSION

The findings of this study show that the BPHR is a simple and useful screening tool for identifying both

prehypertension and hypertension in Indian children. BPHR showed a strong relationship with blood pressure percentiles and demonstrated excellent diagnostic performance, supporting its use as a

practical alternative to conventional BP percentile charts.

The children included in this study were similar in age to Ma et al. who studied 2,730 Turkish children aged.^[6-17] years (mean age 11.52 ± 3.66 years).^[16] Kelishadi et al. included 13,486 Iranian children aged 6-18 years (mean age 12.47 ± 3.36 years), whereas Ladapo et al. assessed 2,364 Nigerian adolescents aged.^[10-18] years (mean age 14.1 ± 2.1 years).^[17,14] Ahmed et al. evaluated 2,702 Kashmiri children aged.^[10-16] years, Gupta et al. studied 1,000 Indian adolescents aged.^[12-18] years, and Trihono et al. analysed 39,057 Indonesian adolescents aged.^[15-18] years.^[18-20] These studies show that BPHR has been assessed across different ethnic groups and age ranges, although differences in growth and body size may influence the screening thresholds.

In this study, hypertension and prehypertension were identified more often using diastolic blood pressure than systolic blood pressure. Similar findings have been reported elsewhere, although the prevalence varies between populations. Ma et al. reported hypertension and prehypertension rates of 5.2% and 12.7%, respectively.^[16] Gupta et al. found hypertension in 5.5% of adolescents (4.8% in boys and 5.8% in girls) and prehypertension in 12% of boys and 14% of girls.^[19] Ladapo et al. reported systolic and diastolic hypertension rates of 5.3% and 4.0%, with prehypertension rates of 16.6% and 7.7%, respectively.^[14] Ahmed et al. observed hypertension in 7.9% of boys and 9.9% of girls, while prehypertension affected 18.3% and 17.8%, respectively.^[18] In contrast, Trihono et al. reported elevated blood pressure in 22.7%, stage 1 hypertension in 5.1%, and stage.^[2] hypertension in 1.8% using the 2017 American Academy of Pediatrics guidelines.²⁰ The findings support previous evidence that elevated blood pressure is common among children, with variations in prevalence across populations likely reflecting differences in study populations and diagnostic criteria.

A strong positive relationship was observed between the BPHR and blood pressure percentiles, with the systolic BPHR showing a stronger association than the diastolic BPHR. This finding is consistent with previous reports. Ahmed et al. found coefficients of determination of 0.799 in boys and 0.844 in girls ($p < 0.001$).^[18] Gupta et al. reported significant correlations between systolic BPHR and systolic BP ($r = 0.697$; $p < 0.001$) and between diastolic BPHR and diastolic BP ($r = 0.705$; $p < 0.001$).^[19] Kelishadi et al. also reported consistently strong correlations, ranging from 0.79-0.96 for systolic BPHR and 0.89-0.97 for diastolic BPHR.^[17] These findings support the close relationship between BPHR and blood pressure in different populations. Sex-specific analysis showed excellent performance in both boys and girls separately. Similar patterns were reported by Ahmed et al., Gupta et al., Trihono et al., and Ladapo et al., although girls generally had slightly

higher cut-off values and diagnostic performance.^[18,19,20,14]

ROC analysis showed excellent diagnostic accuracy, particularly for the systolic BPHR. Ma et al. reported hypertension cut-offs of 0.7767 and 0.4688 with AUCs of 0.937 and 0.880, while prehypertension cut-offs were 0.6849 and 0.4425. Gupta et al. identified hypertension thresholds of 0.765/0.495 in boys and 0.795/0.515 in girls, with diagnostic accuracy above 92%.¹⁹ Ahmed et al. reported systolic hypertension cut-offs of 0.76 in boys and 0.80 in girls, diastolic cut-offs of 0.50 and 0.52, and AUCs between 0.84 and 0.92.¹⁸ Ladapo et al. found systolic cut-offs of 0.76-0.78, diastolic cut-offs of 0.48-0.50, and AUC values above 0.95.¹⁴ Kelishadi et al. reported AUCs of 0.80-0.85 for systolic hypertension and 0.90-0.97 for diastolic hypertension, with cut-offs ranging from 0.71 to 0.82.¹⁷ Trihono et al., however, reported lower thresholds (0.69-0.72 and 0.46-0.48) and poor diastolic performance (AUC = 0.500), probably because only older adolescents were included.²⁰ The ROC findings support the excellent diagnostic accuracy of BPHR and the applicability of similar screening thresholds across diverse paediatric populations

The high sensitivity and negative predictive value observed in this study are consistent with previous findings. Ahmed et al. reported negative predictive values of 99.6-100% and positive predictive values of 28.4-60.6%.¹⁸ Gupta et al. found negative predictive values above 99%, whereas positive predictive values ranged from 10.3% to 75.4%.^[19] Ladapo et al. reported sensitivity of 87-98% and specificity of 64-88%.^[14] The meta-analysis by Ma et al., including 40,307 children, showed a pooled sensitivity of 96%, specificity of 90%, positive likelihood ratio of 10.68, negative likelihood ratio of 0.04, diagnostic odds ratio of 247.82, and AUC of 0.9472.^[16] Similarly, Stabouli et al. concluded that although BPHR has excellent sensitivity, its lower positive predictive value may lead to more false-positive referrals, making it better suited as a screening rather than a diagnostic tool.^[21]

CONCLUSION

There is a strong positive correlation between the BPHR and blood pressure percentiles in Indian children, supporting the use of BPHR as a reliable screening tool for both prehypertension and hypertension. The BPHR is simple, inexpensive, easy to use, and avoids the need for complex age-, sex-, and height-specific BP percentile charts, making it suitable for routine screening.

The optimal systolic and diastolic thresholds were similar in boys and girls, suggesting that common cut-off values can be used irrespective of sex without affecting the diagnostic performance. With its high sensitivity, acceptable specificity, and simple calculation, BPHR is a practical option for screening in schools, primary healthcare centres, and

community programs. It can also be used by trained non-medical personnel for early identification and timely referral, helping to reduce long-term cardiovascular complications associated with childhood hypertension.

REFERENCES

1. Robinson CH, Chanchlani R. High blood pressure in children and adolescents: Current perspectives and strategies to improve future kidney and cardiovascular health. *Kidney Int Rep* 2022; 7:954–70. <https://doi.org/10.1016/j.ekir.2022.02.018>.
2. Jeong SI, Kim SH. Obesity and hypertension in children and adolescents. *Clin Hypertens* 2024; 30:23. <https://doi.org/10.1186/s40885-024-00278-5>.
3. Oikonen M, Nuotio J, Magnussen CG, Viikari JSA, Taittonen L, Laitinen T, et al. Repeated blood pressure measurements in childhood in prediction of hypertension in adulthood. *Hypertension* 2016; 67:41–7. <https://doi.org/10.1161/HYPERTENSIONAHA.115.06395>.
4. Kagura J, Adair LS, Musa MG, Pettifor JM, Norris SA. Blood pressure tracking in urban black South African children: birth to twenty cohort. *BMC Pediatr* 2015; 15:78. <https://doi.org/10.1186/s12887-015-0402-z>.
5. Azegami T, Uchida K, Tokumura M, Mori M. Blood pressure tracking from childhood to adulthood. *Front Pediatr* 2021; 9:785356. <https://doi.org/10.3389/fped.2021.785356>.
6. Lackland DT. Early-life detection of hypertension risks: Implications for clinical practice and research: Implications for clinical practice and research. *Hypertension* 2017; 70:486–7. <https://doi.org/10.1161/HYPERTENSIONAHA.117.09529>.
7. Hardy ST, Urbina EM. Blood pressure in childhood and adolescence. *Am J Hypertens* 2021; 34:242–9. <https://doi.org/10.1093/ajh/hpab004>.
8. James BC, Venkateswaran A, A A, Premkumar B, B S. The prevalence of elevated blood pressure and its association with obesity in children aged 6–13 years in rural India: A cross-sectional study. *Cureus* 2023;15: e37916. <https://doi.org/10.7759/cureus.37916>.
9. Daniel RA, Halder P, Prasad M, Kant S, Krishnan A, Gupta SK, et al. Prevalence of hypertension among adolescents (10–19 years) in India: A systematic review and meta-analysis of cross-sectional studies. *PLoS One* 2020;15: e0239929. <https://doi.org/10.1371/journal.pone.0239929>.
10. Mohan B, Verma A, Singh K, Singh K, Sharma S, Bansal R, et al. Prevalence of sustained hypertension and obesity among urban and rural adolescents: a school-based, cross-sectional study in North India. *BMJ Open* 2019;9: e027134. <https://doi.org/10.1136/bmjopen-2018-027134>.
11. Meena J, Singh M, Agarwal A, Chauhan A, Jaiswal N. Prevalence of hypertension among children and adolescents in India: A systematic review and meta-analysis. *Indian J Pediatr* 2021; 88:1107–14. <https://doi.org/10.1007/s12098-021-03686-9>.
12. Maheshwari A, Gupta R, Verma N, Narasingan SN, Singh RB, Saboo B, et al. Position statement on hypertension by Indian Society of Hypertension, 2023. *J Hum Hypertens* 2024; 38:736–44. <https://doi.org/10.1038/s41371-024-00960-z>.
13. Banker A, Bell C, Gupta-Malhotra M, Samuels J. Blood pressure percentile charts to identify high or low blood pressure in children. *BMC Pediatr* 2016; 16:98. <https://doi.org/10.1186/s12887-016-0633-7>.
14. Ladapo TA, Fajolu IB, Adeniyi OF, Ekure EN, Maduako RO, Jaja TC, et al. Blood pressure to height ratio as a screening tool for prehypertension and hypertension in adolescents. *Niger J Clin Pract* 2016; 19:401–6. <https://doi.org/10.4103/1119-3077.179289>.
15. Ma C, Wang R, Liu Y, Lu Q, Lu N, Tian Y, et al. Performance of user-friendly screening tools for elevated blood pressure in children. *Pediatrics* 2017;139: e20161986. <https://doi.org/10.1542/peds.2016-1986>.
16. Ma C, Liu Y, Lu Q, Lu N, Liu X, Tian Y, et al. The performance of blood pressure-to-height ratio as a screening measure for identifying children and adolescents with hypertension: a meta-analysis: A meta-analysis. *Blood Press Monit* 2016; 21:43–8. <https://doi.org/10.1097/MBP.0000000000000159>.
17. Kelishadi R, Bahreynian M, Heshmat R, Motlagh ME, Djalalinia S, Naji F, et al. Accuracy of blood pressure-to-height ratio to define elevated blood pressure in children and adolescents: The CASPIAN-IV study. *Pediatr Cardiol* 2016; 37:378–85. <https://doi.org/10.1007/s00246-015-1287-1>.
18. Ahmed A, Ali SW, Massodi S, Bhat MA. Blood pressure-to-height ratio as a screening tool for hypertension in children. *Indian Pediatr* 2016; 53:137–9. <https://doi.org/10.1007/s13312-016-0808-1>.
19. Gupta MN, Gosai MM, Otha DD, Gohil JR. Blood pressure to height ratio as a screening tool for hypertension in school going adolescents aged 12–18 years in Bhavnagar, Gujarat. *Int J Med Biomed Stud* 2020;4. <https://doi.org/10.32553/ijmbs.v4i12.1539>.
20. Trihono PP, Sihombing JL, Dewi R. Blood pressure to height ratio for screening hypertension among Indonesian adolescents. *Paediatr Indones* 2023; 63:7–12. <https://doi.org/10.14238/pi63.1.2023.7-12>.
21. Stabouli S, Antza C, Chrysaidou K, Kotsis V. The challenge of simplifying blood pressure screening in children and adolescents. *J Clin Hypertens (Greenwich)* 2020; 22:876–8. <https://doi.org/10.1111/jch.13858>.