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Original Article

Knowledge and Practice About Blood Pressure Measurement in Children: Healthcare Provider's Perspective

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ABSTRACT

Background and Aim: Hypertension (HTN) has become more prevalent among youngsters. It is frequently under-recognized due to a lack of routine blood pressure measurement in many health centers, partly owing to a shortage of devices and possibly because of the notion that it is not the foremost disease in children. In Bangladesh, there is a scarcity of data on how doctors view childhood HTN and their practice of measuring blood pressure in children. We aimed to conduct this survey among pediatricians and healthcare providers to determine the perception and knowledge about childhood HTN and their practice of measuring blood pressure in children, which can be served as a baseline for future reference.

Methods: This cross-sectional mailed-based survey was done on pediatricians and approved by the institutional review board of Dr. Khan Shishu Hospital & the Institute of Child Health from June to December 2021. We obtained the email addresses of all pediatricians from the Bangladesh Pediatric Association. The survey instrument/questionnaire was developed based on the 2017 clinical practice guideline. The data were analyzed and expressed as frequency and percentage.

Results: Of the 536 pediatricians in the mailing sample, 257 cases responded and the response rate was 47.9%. The majority of respondents (62.4%) were general pediatricians and only 12.2% were pediatric nephrologists. This survey revealed that 77.2% of pediatricians did not measure blood pressure routinely among children 3-18 years of age, whereas 66% reported measuring blood pressure if children had risk factors. The majority of pediatricians (92.8%) had blood pressure machines at their clinic and only 60% had blood pressure cuffs available for children. Most of the pediatricians (68.7%) did not use a blood pressure chart for labeling blood pressure and only 35.7% reported that they repeated auscultatory blood pressure measurements three times to diagnose HTN.

Conclusion: The findings of our study point to a knowledge and practice gap among pediatricians, who are primary health care providers, when diagnosing hypertension in children. For children aged 3 to 18 years, most pediatricians reported no regular assessment of blood pressure. Most pediatricians did not repeat blood pressure measurements for diagnosis, nor did they often use blood pressure cuffs or charts for children. These issues need to be addressed for better diagnosis and treatment of childhood HTN.

Keywords: Hypertension, Perception, Child, Knowledge

Introduction

Pediatric hypertension (HTN) has evolved as a global noncommunicable illness of multifactorial origin. HTN among youngsters has become more frequent, with estimates ranging from 2% to 5% [1-3]. Childhood HTN can be secondary to another disease process, or it can be primary HTN. Secondary HTN is more common in children than in adults, and renal disease, aortic coarctation, and endocrine disease being the most common causes of secondary HTN in children [4]. In contrast to adults, many children and adolescents with high blood pressure have essential HTN, for which the exact etiology is mostly unidentified. A family history of HTN, low birth weight, and obesity have all been linked to HTN in children [5-7]. Pediatric HTN has been identified as a significant risk factor for adult-onset HTN and causes left ventricular hypertrophy, atherosclerosis, diastolic dysfunction, stroke, and kidney disease [8-10]. Blood pressure measurement in children is not frequently done during health visits in many parts of the country, partly due to a lack of tools and probably due to the impression that it is not the most serious concern in children [11]. Despite the fact that most pediatricians are aware of the possibility of HTN in children and guidelines for screening and managing BP in children are available, clinicians fail to detect it in their patients [12-14]. Based on the 2017 clinical practice guidelines, the updated definition of hypertension is divided into two age groups: 1-13 years old and children over 13 years old. HTN in children is defined as blood pressure ≥95th percentile +12 mm Hg for age, sex, and height on three separate visits. Elevated blood pressure is defined as a blood pressure ≥90th percentile or ≥120/80 mm Hg at three or more visits but less than the 95th percentile for age, sex, and height. Based on these classifications, numerous normal and abnormal cutoffs exist, which are tough for pediatricians to remember [14].

We determined pediatricians' perceptions and understanding of childhood HTN, as well as their practice of measuring blood pressure in children, as a baseline for future reference. Therefore, this study contributes to our understanding of the reasons for the low rate of diagnosis of HTN in children, as well as what clinicians believe enables them to increase their performance.

Materials & Methods

We conducted a cross-sectional, mail-based survey among pediatricians fielded from June to December 2021. This study was approved by the institutional review board of Dr. Khan Shishu Hospital & Institute of Child Health.

Study sample: We obtained the email addresses of all pediatricians from the Bangladesh Pediatric Association, a comprehensive database of licensed and qualified pediatricians in Bangladesh. Our sampling frame included all pediatricians in this database, which was 536 cases.

Survey design: The survey instrument/questionnaire was developed based on clinical practice guideline 2017 [14]. We sent a Google doc form to everyone containing a structured questionnaire about their recent affiliation, designation, and discipline and six questions about their knowledge and practice about blood pressure measurement in children (Table 1). Do you measure blood pressure in children and adolescents ≥3 years to 18 years? Do you routinely measure BP in those with risk factors for HTN (family history, obesity, diabetes, prematurity H/O, kidney disease, heart disease)? Do you measure blood pressure in the office with the audio method on 3 separate occasions? Do you use a chart or tool to classify blood pressure? Do you have a blood pressure machine available at your clinic or chamber? Are blood pressure cuffs available for children in your clinic or room?

Survey administration: The initial survey mail was sent to all 536 email addresses containing a personal letter explaining the justification of the survey and an attached

Table 1. Pediatricians' responses regarding the availability of BP machines, cuffs, and charts at their clinics

Condition	%		
	Yes	No	Total
BP machine available at clinic/chamber	98.2	2.8	100
BP cuffs for children available at the clinic/chamber	60	40	100
Using a BP chart for making the diagnosis of hypertension according to age, sex, and height	31.3	68.7	100

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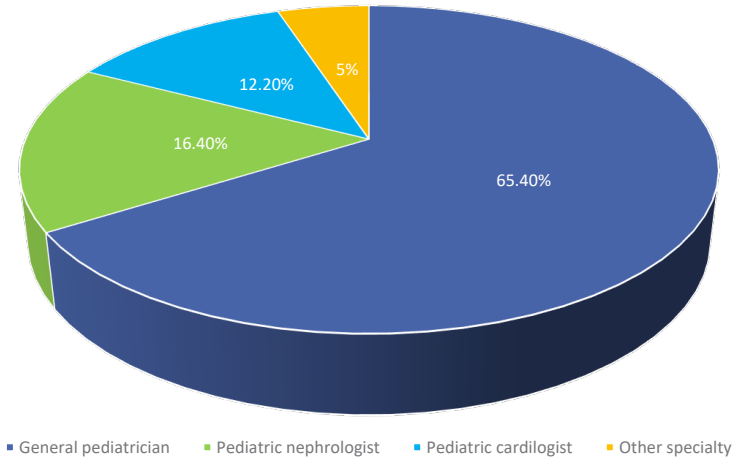

Figure 1. Specialty of the respondent pediatricians

Google doc form containing the questionnaire. Then, we resent two additional emails to non-responders at two monthly intervals.

Data analysis: The data were analyzed and expressed as frequency and percentage.

Results

Of the 536 pediatricians in the mailing sample, 257 cases responded and the response rate was 47.9%.

Among the respondent, 62.4% cases were general pediatricians, 12.2% cases were pediatric nephrologists, 16.6% cases were pediatric cardiologists, 0.5% cases were pediatric neurologists, and 4.9% cases were pediatricians from another subspecialty (Figure 1).

Only 22.8% reported measuring blood pressure routinely in children aged 3-18 years, whereas most pediatricians (77.2%) did not measure blood pressure routinely (Figure 2).

The majority of pediatricians (66.2%) reported measuring blood pressure in children with a risk factor for developing HTN; however, 33.8% responded negatively (Figure 3).

The majority of pediatricians (92.8%) had a blood pressure machine at their clinic and only 7.2% did not have one. Only 60% of pediatricians had blood pressure cuffs available for children and 40% did not have them. Most pediatricians (68.7%) did not use a blood pressure chart for labeling BP (Table 1).

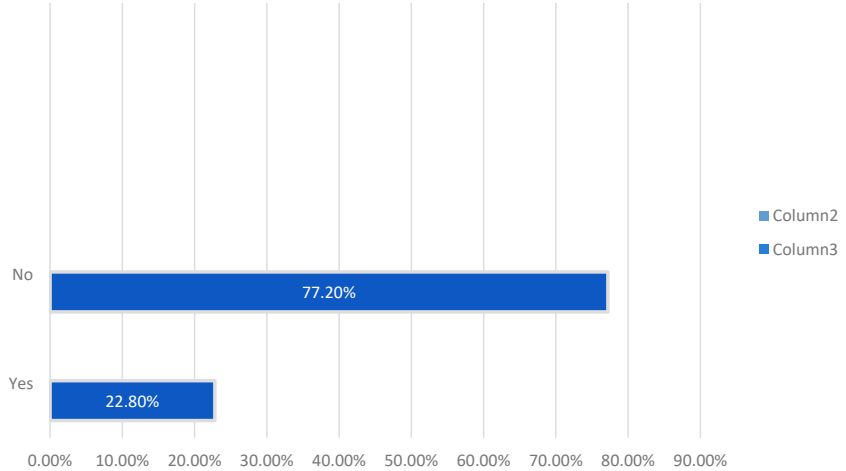

Figure 2. Pediatricians' responses regarding regular blood pressure measurement in children over three years of age and adolescents.

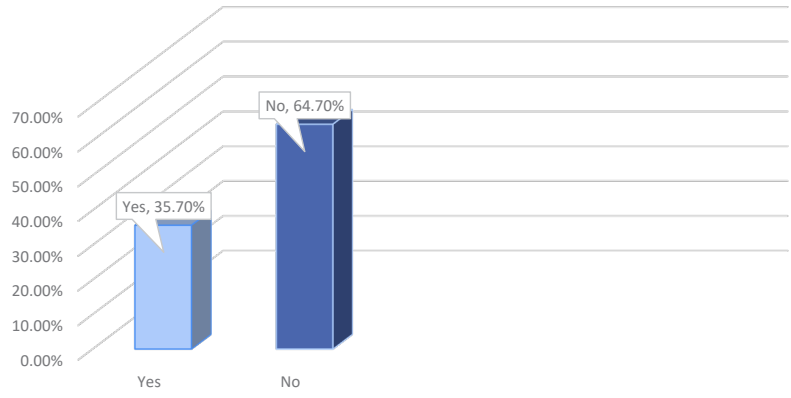

Figure 3. Pediatricians' responses regarding routine blood pressure measurement in children with risk factors

Only 35.7% of pediatricians reported repeating blood pressure measurements in three visits by auscultatory to make a diagnosis of HTN, whereas 64.7% did not repeat (Figure 4).

Discussion

This study simply described pediatricians' perspectives on practice and knowledge of blood pressure measurement in children for the diagnosis of pediatric HTN. Of the 536 pediatricians in the mailing sample, 257 cases responded and the response rate was 47.9%. Among the respondents, most of them (62.4%) were general pediatricians, 12.2% were pediatric nephrologists, 16.6% were pediatric cardiologists, 0.5% were pediatric neurologists, and 4.9% were pediatricians from another subspecialty.

The response rate was slightly lower than the study done by Yoon et al. (61%) [15]. This difference may be due to the smaller number of physicians involved in social networking. In a survey of more than 4,000 physicians conducted by the social media site QuantiaMD, only 65% of physicians used social sites for professional reasons, whereas 90% used them for personal activities [16].

The current study showed that only 22.8% of physicians routinely measure blood pressure. Similarly, it was observed that despite recommendations from the American Academy of Pediatrics to check children's blood pressure starting at age 3, US pediatricians failed to check a child's blood pressure in about a third of routine checkups between 2000 and 2009 [17].

Sixty-six percent of physicians mentioned that they used to measure blood pressure in children who were at risk for developing HTN. But unfortunately, 34% did not practice it. Early diagnosis of elevated blood pressure can promote the introduction of lifestyle changes and reduction of cardiovascular risk later in life [18].

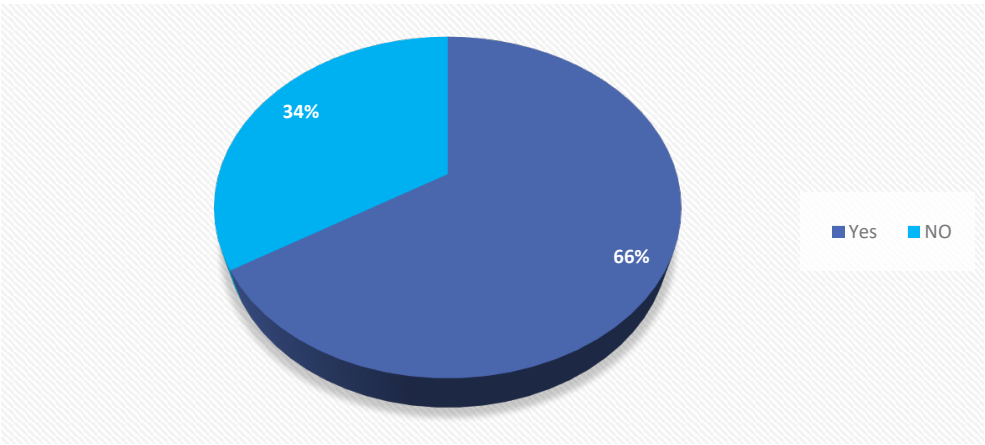

Figure 4. Pediatricians' responses about confirming blood pressure by repeating blood pressure measurement on three separate occasions by auscaltatory method

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While searching for the causes behind this, we found that the majority (98%) had blood pressure measurement machines in their clinics. Appropriate size blood pressure cuff was available in 60% of the physicians' clinics and only 31.3% of physicians practiced blood pressure charts to define HTN. When hypertension was found, repeated measurements on three separate occasions by auscultatory method were performed by only 35.7% of respondents. In a study conducted by Bello et al. the interviews also confirmed that the use of improper technique, lack of proper equipment (improperly sized cuff), and failure to use a manual sphygmomanometer when reexamining abnormal values were common factors.

In a study conducted by Bello et al., the interviews also confirmed that the use of improper technique, lack of proper equipment (improperly sized cuff), and failure to use a manual sphygmomanometer when reexamining abnormal values were common factors during blood pressure measurement that led to missing of childhood HTN [19].

Limitations

The following restriction should be applied when interpreting our findings: physician self-reporting biases may influence findings, and clinical practice may differ from survey responses

Conclusion

Pediatricians had a poor understanding of children's blood pressure measurement and the possible reasons were the non-availability of blood pressure measurement cuffs of appropriate size and blood pressure charts and non-compliance with the standard.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this research

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Authors' contributions

All authors equally contributed to the preparation of this article.

Conflict of interest

The authors declared no conflict of interest.

References

[1] Muntner P, He J, Cutler JA, Wildman RP, Whelton PK. Trends in blood pressure among children and adolescents. JAMA. 2004; 291(17):2107-13. [DOI: 10.1001/jama.291.17.2107] [PMID]

[2] Sorof JM, Lai D, Turner J, Poffenbarger T, Portman RJ. Overweight, ethnicity, and the prevalence of hypertension in school-aged children. Pediatrics. 2004; 113(3 Pt 1):475-82. [DOI:10.1542/peds.113.3.475] [PMID]

[3] Moore WE, Stephens A, Wilson T, Wilson W, Eichner JE. Body mass index and blood pressure screening in a rural public school system: The healthy kids project. Prev Chronic Dis. 2006; 3(4):A114. [PMID] [PMCID]

[4] Sinaiko AR. Hypertension in children. N Engl J Med. 1996; 335(26):1968-73. [DOI:10.1056/NEJM199612263352607] [PMID]

[5] Peters RM, Templin TN. Measuring blood pressure knowledge and self-care behaviors of African Americans. Res Nurs Health. 2008; 31(6):543-52. [Link]

[6] Franco MC, Christofalo DM, Sawaya AL, Ajzen SA, Sesso R. Effects of low birth weight in 8- to 13-year-old children: implications in endothelial function and uric acid levels. Hypertension. 2006; 48(1):45-50. [DOI:10.1161/01.HYP.0000223446.49596.3a] [PMID]

[7] Munger RG, Prineas RJ, Gomez-Marin O. Persistent elevation of blood pressure among children with a family history of hypertension: The minneapolis children's blood pressure study. J Hypertens. 1988; 6(8):647-53. [DOI:10.1097/00004872-198808000-00008] [PMID]

[8] Arnett DK, Glasser SP, McVeigh G, Prineas R, Finklestein S, Donahue R, et al. Blood pressure and arterial compliance in young adults: The Minnesota children's blood pressure study. Am J Hypertens. 2001; 14(3):200-5. [DOI:10.1016/s0895-7061(00)01262-0] [PMID]

[9] Berenson GS, Srinivasan SR, Bao W, Newman WP 3rd, Tracy RE, et al. Association between multiple cardiovascular risk factors and atherosclerosis in children and young adults. The Bogalusa heart study. N Engl J Med. 1998; 338(23):1650-56. [DOI: 10.1056/NEJM199806043382302] [PMID]

[10] Knoflach M, Kiechl S, Kind M, Kind M, Said M, Sief R, et al. Cardiovascular risk factors and atherosclerosis in young males: ARMY study (atherosclerosis risk-factors in male youngsters). Circulation. 2003; 108(9):1064-9. [DOI:10.1161/01.CIR.0000085996.95532.FF] [PMID]

[11] Revelas A, Tohmazidis O. Defining hypertension in children. South African Family Practice. 2012; 54(2):100-5. [Link]

[12] Hansen ML, Gunn PW, Kaelber DC. Underdiagnosis of hypertension in children and adolescents. JAMA. 2007; 298(8):874-9. [DOI:10.1001/jama.298.8.874] [PMID]

[13] National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents. The fourth report on the diagnosis, evaluation, and treatment of high blood pressure in children and adolescents. Pediatrics. 2004; 114(2 Suppl 4th Report):555-76. [PMID]

[14] Flynn JT, Kaelber DC, Baker-Smith CM, Blowey D, Carroll AE, Daniels SR, et al. Clinical practice guideline for screening and management of high blood pressure in children and adolescents. Pediatrics. 2017; 140(3):e20171904. [DOI:10.1542/peds.2017-1904] [PMID]

[15] Yoon E, McCool B, Filipp S, Rocchini A, Kershaw D, Clark S. Pediatric hypertension specialists' perspectives about adolescent hypertension management: Implications for primary care providers. Clin Pediatr (Phila). 2015; 54(6):551-6. [DOI:10.1177/0009922814558248] [PMID]

[16] Ventola CL. Social media and health care professionals: Benefits, risks, and best practices. P T. 2014; 39(7):491-520. [PMID] [PMCID]

[17] Norton A. Pediatricians may skip kids' blood pressure checks. Reuter's Health [Internet]. 2018 [Updated 2023 July]. Available from [Link]

[18] Jankauskiene A. Why is it important to measure blood pressure in children and adolscents? [Internet]. 2021 [Updated 2023 July]. Available from: [Link]

[19] Bello JK, Mohanty N, Bauer V, Rittner SS, Rao G. Pediatric hypertension: Provider perspective. Glob Pediatr Health. 2017; 4:1-10. [DOI:10.1177/2333794X177126]