



A new index to simplify the screening of hypertension in overweight or obese youth



P. Di Bonito ^a, G. Valerio ^{b,*}, L. Pacifico ^c, C. Chiesa ^d, C. Invitti ^e, A. Morandi ^f,
C. Maffei ^g, M.R. Licenziati ^h, M. Manco ⁱ, E. Miraglia del Giudice ^j, M.G. Baroni ^{k,l},
S. Loche ^m, G. Tornese ⁿ, M. Tomat ^o, G. de Simone ^p for the CARITALY Study Group¹

^a Department of Internal Medicine, "S. Maria delle Grazie", Pozzuoli Hospital, Naples, Italy

^b Department of Movement Sciences and Wellbeing, University of Naples Parthenope, Naples, Italy

^c Policlinico Umberto I Hospital, Sapienza University of Rome, Rome, Italy

^d Institute of Translational Pharmacology, National Research Council, Rome, Italy

^e IRCCS Istituto Auxologico Italiano, Department of Medical Sciences & Rehabilitation, Milan, Italy

^f Pediatric Diabetes and Metabolic Disorders Unit, University Hospital of Verona, Verona, Italy

^g Pediatric Diabetes and Metabolic Disorders Unit, University of Verona, Verona, Italy

^h Department of Pediatrics, AORN Santobono-Pausilipon, Naples, Italy

ⁱ IRCCS Bambino Gesù Children's Hospital, Rome, Italy

^j Department of Woman, Child and General and Specialized Surgery, University of Campania "Luigi Vanvitelli", Naples, Italy

^k Endocrinology and Diabetes, Department of Medical Sciences, University of Cagliari, Cagliari, Italy

^l Department of Experimental Medicine, Sapienza University of Rome, Rome, Italy

^m Pediatric Endocrine Unit, Pediatric Hospital for Microcitemia, AO Brotzu, Cagliari, Italy

ⁿ Institute for Maternal and Child Health IRCCS "Burlo Garofolo", Trieste, Italy

^o Pediatric Unit, AOU Udine, Udine, Italy

^p Hypertension Research Center, Department of Translational Medical Sciences, Federico II University of Naples, Naples, Italy

Received 14 February 2017; received in revised form 19 June 2017; accepted 20 June 2017

Handling Editor: A. Siani

Available online 30 June 2017

KEYWORDS

Blood pressure to
height ratio;
Diagnostic criteria;
High blood pressure;
Pediatric obesity

Abstract *Background and aims:* Hypertension (HTH) is a frequent complication in pediatric obesity. To simplify the screening of HTH in overweight/obese (Ow/Ob) youth, we compared the performance of a new index (High Blood Pressure index, HBPI) with respect to the standard criteria of the IV Report [systolic BP (SBP) and/or diastolic BP (DBP) ≥ 95 th percentile for age, gender and height]. We also compared the performance of HBPI with other simplified indices such as the BP/height ratio and the absolute height-specific BP thresholds. Ten pediatric out-patient centers participating in the "CARDiometabolic risk factors in ITALY study" provided medical records of 4225 Ow/Ob children and adolescents (age 6–16 years).

Methods and results: Centers were divided into two groups: training set (TS) (n = 2204 participants) and validation set (VS) (n = 2021 participants). The simplified HBPI (mmHg) was: $(SBP/2 + DBP/10) - \text{age} + (1 \times \text{female gender})$. In the TS, a HBPI value ≥ 57 mmHg in both children and adolescents had high sensitivity (0.89), specificity (0.97), positive (0.89) and negative (0.97) predictive values in classifying youth at high risk of HTN compared with the IV Report. In the VS, the HBPI showed a better performance than high levels of BP/height ratio and height-specific BP thresholds in classifying individuals at risk of HTN: area under curves 0.95 (0.93–0.96), 0.80 (0.78–0.82), 0.76 (0.74–0.79), respectively; specificities 0.95 (0.94–0.96), 0.69 (0.67–0.72), 0.60 (0.57–0.62), respectively.

* Corresponding author. Department of Movement Sciences and Wellbeing, University of Naples "Parthenope", via Medina 40, 80133 Naples, Italy.
E-mail address: giuliana.valerio@uniparthenope.it (G. Valerio).

¹ See appendix for detailed list of CARITALY investigators, who belong to the Childhood Obesity Study Group of the Italian Society of Pediatric Endocrinology and Diabetology.

Conclusions: HBPI, combining SBP and DBP, gender and age, may help pediatricians to implement HTN screening in Ow/Ob youth.

© 2017 The Italian Society of Diabetology, the Italian Society for the Study of Atherosclerosis, the Italian Society of Human Nutrition, and the Department of Clinical Medicine and Surgery, Federico II University. Published by Elsevier B.V. All rights reserved.

Pediatric obesity is a growing burden in terms of public health, given its prevalence in industrialized societies and its relationship with other pathological conditions such as altered glucose metabolism, dyslipidemia and insulin-resistance. Hypertension (HTN) is the most frequent complication in pediatric obesity, and its prevalence has risen over time in parallel with that of obesity [1,2]. In addition this complication is considered a risk factor for HTN in adults [3–5]. According to the National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents (IV Report) [6], HTN is defined as systolic blood pressure (SBP) and/or diastolic blood pressure (DBP) \geq 95th percentile by gender, age, and height. Thus the guidelines for the diagnosis of HTN in children recommend the use of charts based on age, gender and height [6–8]. When blood pressure (BP) is measured, the essential steps are based on interpretation and repeated measurements to confirm HTN diagnosis. However this procedure in children is quite complex and requires determination of height percentiles, comparison of measurements of SBP and DBP versus the age-adjusted values provided in the gender-specific tables. This might hamper Pediatricians' ability to perform extensive screening for HTN, leading to misrepresentation of prevalence and incidence of HTN in childhood [9,10], as well as to underestimation of its deleterious consequences on health. Indeed, some recent studies have provided evidence of poor compliance with guidelines for BP screening during healthcare pediatric visits [11–13]. In a multicenter study, Bijlsma et al. found out that 71% of physicians measure BP during medical examinations only if the child might show risk factors for hypertension [12]. After measuring BP, only 65% compared the reading with reference data if suspecting that the reading was elevated. These studies imply that without the use of reference data, physicians might miss cases of childhood HTN, by underestimating the BP percentile. Yet, Stabouli et al. reported that less than half of children above three years old had never been screened for HTN during pediatric care visits [13]. Similar results have been also reported in pediatric tertiary care settings [14]. Among the barriers commonly faced in identifying patients with elevated BP, lack of time was reported by 34% of respondents [14]. Therefore, easier procedures such as new simplified tables [15,16] or indexes such as the BP-to-height ratio (BPHtR) have been receiving growing interest in order to simplify HTN diagnosis in childhood [16–22]. However, even the BPHtR requires complex calculations including gender and age, and specific cut-points for age-class and gender. In

addition, various thresholds have been obtained [20], which can lead to further confusion. Nevertheless, none of these simplified methods have been validated in a population of overweight/obese (Ow/Ob) children and adolescents.

Therefore, the present cross-sectional study was designed first to assess the performance of a new high blood pressure index (HBPI) to identify Ow/Ob youth at risk of HTN, compared with the standard definition of BP \geq 95th percentile for gender, age and height, and second to compare the performance of the new index with two simplified methods including the BPHtR and the absolute height-specific BP thresholds [16].

Methods

Study population

“CARDiometabolic risk factors in overweight and obese children in ITALY” (CARITALY) is a cross-sectional study endorsed by the Childhood Obesity Group of the Italian Society of Pediatric Endocrinology and Diabetology. It was designed to investigate the prevalence of major cardiometabolic risk factors in children attending outpatient clinics for the management of Ow and Ob in secondary and tertiary Pediatric care centers in Italy. Medical centers were selected on the basis of the availability of anthropometric, clinical and laboratory facilities for assessing the cardiometabolic risk profile. Exclusion criteria were secondary obesity, chronic diseases, congenital malformations, and chronic use of medications potentially affecting BP, lipid or glucose profiles [23].

Ten outpatient clinics from community or university hospitals participated in this study, providing medical records of 4225 Caucasian Ow/Ob children and adolescents (age 6–16 years) who attended the centers over an 11-year period (2003–2013). Centers have been divided into two groups: the former (5 clinics, $n = 2204$ participants) was the training set, the latter (5 clinics, $n = 2021$ participants) was the validation set. The division considered the catchment area of the participants, which was equally distributed between the groups: one center from the south, two centers from the center and two centers from the north of Italy, respectively. The study was led in accordance with the 1975 Declaration of Helsinki as revised in 1983, and informed consent was obtained from the parents of all participants. To ensure data protection and confidentiality, data were de-identified before being transmitted to the coordinating center for analyses.

Download English Version:

<https://daneshyari.com/en/article/5619083>

Download Persian Version:

<https://daneshyari.com/article/5619083>

[Daneshyari.com](https://daneshyari.com)