Rev Port Cardiol. 2017;xxx(xx):xxx–xxx

Revista Portuguesa de Cardiologia
Portuguese Journal of Cardiology
www.revportcardiol.org

ORIGINAL ARTICLE

Cardiovascular risk factors in children☆

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Received 13 July 2016; accepted 17 December 2016

KEYWORDS
Child;
Nutritional status;
Cardiovascular disease

Abstract
Introduction: Systemic hypertension is one of the main risk factors for cardiovascular disease (CVD). Early diagnosis and treatment of hypertension in childhood can potentially have a significant impact on future adverse outcomes.
Objective: To investigate the relationship of diastolic (DBP) and systolic blood pressure (SBP) with anthropometric data and area of residence of children in municipalities of Rio Grande do Sul state, Brazil.
Methods: This is a cross-sectional study of 709 children between six and nine years of age. Blood pressure, weight, height and waist circumference (WC) were measured. Statistical tests had a maximum significance level of 5% ($p \leq 0.05$) and the software used was SPSS version 13.0.
Results: Obesity was significantly associated with pre-hypertension, and stage 1 and 2 hypertension as assessed by DBP and SBP (≤ 0.05); high WC was significantly associated with a classification of pre-hypertension and stage 1 hypertension based on DBP and a classification of stage 1 and 2 hypertension based on SBP (≤ 0.01).
Conclusion: Children living in urban areas had significantly higher mean SBP than those living in rural areas. Those with high WC presented higher SBP and DBP compared to children with normal WC. Obese children showed higher mean SBP and DBP compared to those who were overweight or normal weight and mean SBP and DBP also increased with older age and higher mean body mass index and WC.

☆ Please cite this article as: Fraporti MI, Scherer Adami F, Dutra Rosolen M. Fatores de risco cardiovascular em crianças. Rev Port Cardiol. 2017. http://dx.doi.org/10.1016/j.repc.2016.12.013

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PALAVRAS-CHAVE
Criança;
Estado nutricional;
Doença cardiovascular

Fatores de risco cardiovascular em crianças

Resumo
Introdução: A hipertensão arterial sistêmica (HAS) destaca-se como um dos principais fatores de risco para doenças cardiovasculares (DCV). O diagnóstico e tratamento precoce da hipertensão na infância tem potencial de causar grande impacto contra desfechos adversos futuros.
Objetivo: Verificar a relação da pressão arterial diastólica (PAD) e sistólica (PAS) com avaliação antropométrica e a zona residencial de crianças de municípios do Rio Grande do Sul, Brasil.
Métodos: Trata-se de um estudo de modelo transversal, realizado com 709 crianças de seis anos completos a nove anos incompletos. Foram aferidas a pressão arterial, peso corporal, altura e circunferência da cintura (CC). Utilizaram-se testes estatísticos, com nível de significância máximo de 5% ($p \leq 0,05$) e o *software* utilizado para esta análise foi o SPSS versão 13,0.
Resultados: A obesidade foi significativamente associada à pré-hipertensão, HAS grau um e dois. A CC elevada foi significativamente associada à classificação da PAD de pré-hipertensão e HAS grau 1 e de PAS HAS grau um e HAS grau dois ($\leq 0,01$).
Conclusão: As crianças residentes na zona urbana apresentaram médias de PAS significativamente superiores às que residiam na zona rural. Aquelas com CC elevada apresentaram médias de PAS e PAD superiores em relação às crianças com CC normal. As crianças obesas demonstraram as maiores médias de PAS e PAD, em relação às com sobrepeso e às eutróficas e, à medida que aumentaram as médias de idade, índice de massa corporal e CC, as médias da PAS e PAD aumentaram também.

Introduction

Cardiovascular disease (CVD) is the leading cause of disability and premature death worldwide, and hypertension is one of its main risk factors.[1] Obesity is considered a global epidemic, together with an increase in cardiovascular risk factors such as hypertension. High blood pressure (BP) in childhood predicts hypertension in adulthood and is associated with cardiovascular events. Thus, early diagnosis and treatment of hypertension in childhood can potentially have a significant impact on future adverse outcomes.[2]

The prevalence of high BP among children has risen in recent decades, and if the condition is left undiagnosed and hence untreated it may persist into adulthood.[3] This can lead to target organ damage such as left ventricular hypertrophy, increased carotid artery thickness, vascular changes in the retina, and subtle cognitive alterations.[1]

It is now mandatory to measure BP annually from the age of three, or before in the presence of risk factors. However, the complexity of BP measurement in children means that many health professionals do not perform the exam routinely or misinterpret the results, which may result in underdiagnosis, with irreversible consequences for the individuals involved.[2]

Excess weight is an important predictor of high BP in children. Thus, a child's nutritional status, as assessed by body mass index (BMI), can indicate a risk of hypertension. Obesity has been identified as an important risk factor for CVD, but other factors, whether or not linked to obesity, also affect this risk.[4]

Waist circumference (WC), a measure of abdominal obesity, can be used by itself to determine the risk of metabolic disorders and CVD in children and adolescents.[5] Studies have shown that WC in children is related to abdominal fat and CVD risk factors such as high total and low-density lipoprotein (LDL) cholesterol and low high-density lipoprotein (HDL) cholesterol.[6]

The objective of this study was to investigate the relationship between diastolic (DBP) and systolic BP (SBP) and anthropometric data including WC, gender, age and area of residence in children between six and nine years of age, in the municipalities of Vale do Taquari, in Rio Grande do Sul state, Brazil.

Methods

This is a cross-sectional, population-based study of children in the Vale do Taquari municipal school network of Rio Grande do Sul state. The data were collected from a secondary database of children and adolescents compiled in 2012 and 2013. Data for the present study included only those related to children aged between six and nine years registered in municipal schools, making up a sample of 709 children of both sexes. Written informed consent was obtained from the parents or guardians of all children included in the study. Those who were absent on the day of data collection or who refused to participate at any stage of the study were excluded from the analysis.

Height was measured in cm, to an accuracy of 1 mm, on a portable stadiometer (Avanutri). BMI was classified according to the World Health Organization (WHO)[7] into four groups: thin, normal, overweight and obese. Values were classified according to the percentiles and cut-offs in the