



ORIGINAL ARTICLE

## Prevalence of dyslipidemia in adolescents: Comparison between definitions



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### KEYWORDS

Risk factors;  
Cardiovascular  
disease;  
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Youth

### Abstract

**Introduction:** The indiscriminate use of different diagnostic criteria for the definition of dyslipidemia may result in inaccurate interpretations, which could compromise diagnosis and therefore the therapeutic and prophylactic actions to be taken.

**Objective:** To analyze possible differences in prevalence rates of dyslipidemia in adolescents based on three diagnostic definitions.

**Methods:** A cross-sectional study was conducted of a representative sample of Brazilian adolescents between 11 and 16 years of age. Blood samples were collected from 1000 students (423 boys and 577 girls) to determine fasting total cholesterol (TC), HDL and LDL cholesterol, and triglycerides (TG). The prevalence of dyslipidemia was established according to three definitions: those of the National Cholesterol Education Program (NCEP), the Brazilian Society of Cardiology (BSC), and the National Health and Nutrition Examination Survey (NHANES).

**Results:** Significant differences ( $p < 0.01$ ) were found between the diagnostic criteria for TC (BSC 38.3%; NCEP 11.2%; NHANES 4.8%), HDL cholesterol (BSC 30.0%; NCEP 15.8% NHANES 18.4%), LDL cholesterol (BSC and NCEP 10.8% and NHANES 5.9%), and TG (BSC and NCEP 4.7% and NHANES 1.3%). The overall prevalence of dyslipidemia was 61% (BSC), 28.6% (NCEP) and 24.2% (NHANES). Agreement rates varied significantly ( $\kappa$  0.15–0.90).

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## PALAVRAS-CHAVE

Fatores de risco;  
Doenças  
cardiovasculares;  
Aterosclerose;  
Jovens

**Conclusions:** Although a high prevalence of dyslipidemia was observed in this study regardless of the diagnostic criteria used, the wide variation in rates highlights the need to establish a single definition with appropriate discriminatory power for adolescents.

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## Prevalência de dislipidemias em adolescentes: comparação entre diferentes critérios

### Resumo

**Fundamento:** O uso indiscriminado de diferentes critérios diagnósticos para a determinação de dislipidemias pode resultar em interpretações imprecisas, podendo comprometer o diagnóstico e, conseqüentemente, as ações terapêuticas e profiláticas a serem empregadas.

**Objetivo:** Analisar possíveis diferenças nas taxas de prevalência de dislipidemias em adolescentes, com base em três critérios diagnósticos.

**Métodos:** Estudo transversal conduzido com uma amostra representativa de adolescentes brasileiros de 11 a 16 anos. Amostras de sangue foram coletadas de 1000 escolares (423 rapazes e 577 moças) para determinação do colesterol total (CT), HDL, LDL e triglicérides (TG) em jejum. A prevalência de dislipidemias foi estabelecida com base em três critérios diagnósticos: *National Cholesterol Education Program* (NCEP), Sociedade Brasileira de Cardiologia (SBC) e *National Health and Nutrition Examination Survey* (NHANES).

**Resultados:** Diferenças significantes ( $p < 0,01$ ) foram identificadas entre os critérios diagnósticos analisados para CT (SBC=38,3%; NCEP=11,2%; NHANES=4,8%), HDL (SBC=30,0%; NCEP=15,8%; NHANES=18,4%), LDL (SBC/NCEP=10,8% e NHANES=5,9%) e TG (SBC/NCEP=4,7% e NHANES=1,3%). No geral, a prevalência de dislipidemias foi na ordem de 61% (SBC); 28,6% (NCEP) e 24,2% (NHANES). Os índices de concordância variaram amplamente ( $Kappa=0,15$  a  $0,90$ ).

**Conclusões:** Embora uma elevada prevalência de dislipidemias tenha sido identificada neste estudo, independente dos critérios diagnósticos utilizados, a ampla variação nas taxas encontradas reforça a necessidade do estabelecimento de um critério único e com poder de discriminação adequado para adolescentes.

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## Introduction

Coronary artery disease is one of the leading causes of death worldwide,<sup>1,2</sup> and dyslipidemia is one of its main risk factors.<sup>3,4</sup> In adolescents, an increase in the prevalence of dyslipidemia has been observed in several studies, especially during the last decade.<sup>5–11</sup> Thus, although it does not usually manifest in children and adolescents, the beginning of the atherosclerotic process may occur early at these stages of life.<sup>12–14</sup>

Dyslipidemia is characterized by disorders in lipid metabolism, which lead to changes in the serum levels of circulating lipids and lipoproteins,<sup>4,15</sup> and its subclassifications are established by determining the concentrations of triglycerides (TG), total cholesterol (TC) and its high-density lipoprotein (HDL-C) and low-density lipoprotein (LDL-C) fractions. However, one of the main problems faced by researchers and health care professionals is the indiscriminate use of different criteria for the diagnosis of dyslipidemia, particularly in adolescents.

According to the National Cholesterol Education Program (NCEP),<sup>16</sup> dyslipidemia is defined as HDL-C  $< 40$  mg/dl and TC,

LDL-C and TG levels  $\geq 200$ ,  $\geq 130$  and  $\geq 130$  mg/dl, respectively. This recommendation was adopted as a reference for the Brazilian population until the middle of the last decade, with the support of the Brazilian Society of Cardiology (BSC).<sup>15</sup> In 2005, the current NCEP definition was revised by the BSC, which proposed more stringent cutoff points for adolescents.<sup>17</sup>

However, none of the above cutoff points considered differences between the sexes, which are particularly important regarding the maturation process. A new proposal was therefore presented based on data from the National Health and Nutrition Examination Survey (NHANES), establishing cutoff points for TC, LDL-C, HDL-C and TG levels according to the variables of age and gender: for boys aged 12–16, 223–233 mg/dl for TC, 144–153 mg/dl for LDL-C and 163–195 mg/dl for TG; and for girls, 208–225 mg/dl, 136–145 mg/dl and 158–180 mg/dl for TC, LDL-C and TG, respectively. HDL-C only shows variation in boys, with values 39–46 mg/dl, for the age-group in question.<sup>18</sup>

Considering the cutoff points recommended by each definition (NCEP, BSC and NHANES), our hypothesis is that the adoption of different criteria may significantly affect the

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