

CARDIOVASCULAR RISK FACTORS: DIAGNOSIS AND PREVENTION MUST START IN CHILDREN AND ADOLESCENTS

FATORES DE RISCO CARDIOVASCULAR: O DIAGNÓSTICO E PREVENÇÃO DEVEM INICIAR NAS CRIANÇAS E ADOLESCENTES

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Received on 08/30/2018,
Accepted on 01/28/2019

ABSTRACT

Childhood and adolescence constitute the transition to adult life, where changes occur in the physical, psychological, emotional and social spheres. In such a crucial period of development, environmental factors and diseases to which young people are exposed may have repercussions in adulthood, increasing the chances of developing chronic diseases, including cardiovascular disease (CVD). The main etiology of cardiovascular diseases is atherosclerosis, which has its onset in childhood. Accordingly, it is currently recognized that primordial prevention of cardiovascular disease should begin early, i.e. in childhood and adolescence, prior to its actual onset, in order to reduce the prevalence and incidence of CVD in adulthood.

Keywords: Risk Factors; Cardiovascular Diseases; Child; Adolescent.

RESUMO

A infância e a adolescência são períodos que compreendem a transição para a vida adulta, no qual ocorrem mudanças no âmbito físico, psicológico, emocional e social. Nesse período tão crucial para o desenvolvimento, fatores ambientais e doenças aos quais os jovens estão expostos podem refletir na vida adulta, gerando maiores chances de desenvolvimento de doenças crônicas, incluindo a doença cardiovascular (DCV). A principal etiologia das doenças cardiovasculares é a aterosclerose, que tem seu início na infância. Dessa forma, é reconhecido atualmente que a prevenção cardiovascular primordial deve iniciar precocemente, na infância e adolescência, antes da instalação da doença de fato, de modo a diminuir a prevalência e incidência das DCV na idade adulta.

Descritores: Fatores de Risco; Doenças Cardiovasculares; Criança; Adolescente.

INTRODUCTION

Childhood and adolescence are periods that comprise the transition to adulthood, when physical, psychological, emotional, and social changes occur.¹ During this period, biological and psychosocial changes include but are not limited to the accumulation of experiences, biological maturation, and the development of autonomy and independence.² In such a crucial period of development, young people's exposure to environmental factors and diseases may have repercussions in adulthood, increasing the risk of the development of chronic diseases including cardiovascular diseases (CVDs).

Atherosclerosis, the main etiology of CVDs, is known to begin in childhood, with the onset of fatty streaks (precursors of atherosclerotic plaques) and lipid deposition in the intimal layer of the aorta as early as age 3 years.⁴ Therefore, early cardiovascular prevention prior to disease onset is critical.

EPIDEMIOLOGY OF CARDIOVASCULAR RISK FACTORS IN CHILDREN AND ADOLESCENTS

Several risk factors for CVDs are well established, including dyslipidemia, obesity, eating habits, hypertension, diabetes mellitus, sedentary lifestyle, smoking, and family history of coronary artery disease, all of which, except for genetic load, can be modified.^{5,6}

Evidence shows that the prevalence of overweight and obesity increased from 4.1% to 13.9% among children and adolescents aged 6–18 years over a 20-year period in Southeast and Northeast Brazil.⁷ Furthermore, studies in Brazilian cities found a 30% prevalence of obesity and overweight in children and adolescents.⁸ Obesity has an intimate relationship with other modifiable cardiovascular risk factors since it is the major cause of the development of essential hypertension in children of all ages and both sexes.⁹ Children who are

overweight or obese are 2–3 times more likely to develop hypertension.⁹ Furthermore, it is estimated that 20–30% of obese children have hypertension.¹⁰

Another risk factor related to obesity in children and adolescents is diabetes mellitus type 2. Peripheral insulin resistance and high fasting plasma insulin levels are common alterations in obese individuals. These changes are considered the early signs of diabetes.¹¹ A study of obese children and adolescents found impaired glucose tolerance in 25% of cases, while 4% of the adolescents had diabetes mellitus type 2.¹²

Findings from the Campinas study¹³ indicated that the prevalence of overweight and obesity in the public school population was 15.7% and 16.0%, respectively. In this survey, overweight had a positive correlation with the consumption of sweets, soft drinks, snack foods, and fast food ($p < 0.001$). Moreover, overweight was more prevalent in the younger group (7–12 years, 33.9%) than in the older group (13–18 years, 26.6%).

At all ages, high blood pressure levels correspond to overweight. The subjects maintained sedentary habits, such as watching television and spending time on video games and computers, a mean 3.29 hours per day. However, most (67.25%) of the children who engaged in some physical activity outside the scholastic environment were not overweight. Children who spent more time in front of screens also experienced greater stress levels at home and at school, another factor contributing to weight gain and higher blood pressure levels.¹⁴

Accordingly, obesity may be considered a triggering factor for other risk factors for CVD. In one study, approximately 60% of overweight children and adolescents presented with at least one risk factor for CVD (hypertension, dyslipidemia, or hyperinsulinemia), while 20% presented with two or more risk factors.¹⁵

The increased incidence of obesity among children and adolescents might be explained by changes in eating habits and lifestyle. The literature shows that less physical activity leads to an increase in sedentary habits.¹⁶ There is also a growing consumption of foods rich in simple carbohydrates and fat with high caloric indexes. Both are environmental factors that may explain the increase in obesity rates.¹⁶

Smoking is another preventable risk factor for CVD. A 1989 study¹⁷ indicated that the prevalence of smoking among students was 20%; however, a 2005 study indicated a prevalence of 2.4%. The latter result may be due to an increase in anti-tobacco campaigns in the period under analysis.¹⁸

Finally, a sedentary lifestyle, which is closely related to obesity and the risk of developing CVD, is highly prevalent among children and adolescents in Brazil (estimated 89.5%).¹⁹

CONSEQUENCES IN ADULTHOOD

Modifiable risk factors for CVD among children and adolescents are highly prevalent in Brazil and may contribute to the high mortality rates due to CVD in adulthood.

It is known that the atherosclerotic process begins in childhood and progresses over the years and that its severity is directly proportional to the risk factors.²⁰

Childhood obesity, for example, is a predictor for the early development of CVD, diabetes mellitus type 2, hypercholesterolemia, and hypertension in adulthood.²¹ Moreover, obese children and adolescents are at higher risk of becoming obese adults, which implies a greater risk of chronic diseases such as cancer, osteoarthritis, cerebrovascular accident, and CVD.³

Hypertension, as well as obesity, is a major cardiovascular risk factor that increases the chances for coronary artery disease, myocardial infarction, cerebrovascular accident, and congestive heart failure.²²

A study found that adolescents with diabetes, i.e. high insulin levels, were more likely to become obese in adulthood than individuals with normal insulin levels. Moreover, young people with insulin resistance were 2.5 times more likely to develop hypertension and 3 times more likely to develop dyslipidemia.²³ Accordingly, evidence shows that the presence of risk factors for CVD contributes to their persistence in adulthood and, as a consequence, to a higher risk of cardiovascular events.

ROLE OF HEALTHCARE AND MULTIDISCIPLINARY PROFESSIONALS IN PREVENTING FUTURE CARDIOVASCULAR EVENTS

Treatment for risk factors for CVD must be performed by a multidisciplinary team and should aim for lifestyle changes such as curbing physical inactivity and assuming a healthy diet. Family participation is also very important to treatment adherence and success.²⁴ A vital strategy for decreasing obesity in children and adolescents involves inducing changes in eating habits in schools. Thus, it is essential to create nutritional education programs and promote sports activities.²⁵ With the nutritional approach, we must pay attention to age group recommendations regarding calorie and nutritional intake. A lower intake of soft drinks, fats, and high-calorie foods and a higher intake of fruits and vegetables may be recommended.²⁴ Moreover, this approach should also encourage the consumption of fiber-rich foods, decrease the consumption of simple carbohydrates, promote the consumption of lean meats, and encourage the overweight or obese adolescent's integration into support groups.²⁴

With regard to physical activity, rigorous activity for 30–45 minutes a day at least 3 days a week is recommended for weight loss.²⁴

Interestingly, consensus is lacking on the indications of the association of pharmacological and non-pharmacological treatment.²⁴

Screening for hypertension in children and adolescents may identify the disease at an early stage, improving the chances of intervention and decreasing the rate of progression of hypertension into adulthood, thereby decreasing the abovementioned consequences.²⁶ Similarly, reduced adiposity in the transition between adolescence and adulthood was associated with a marked decrease in the risk of type 2 diabetes, hypertension, and dyslipidemia.²⁷

Thus, we note that care for children and adolescents at risk for cardiovascular diseases should include a variety of healthcare professionals to achieve better results. In our adolescent cardiology outpatient clinic at the Institute of Adolescent Medicine of the ABC Foundation School of Medicine, we observed that a multidisciplinary approach was essential to increasing the adherence of young people to medical consultations and healthcare directives. Therefore, we emphasize once again the importance of a team-based approach to treating children and adolescents with risk factors for CVD.

CONFLICTS OF INTEREST

The authors declare that he has no conflicts of interest in this work.

AUTHORS' CONTRIBUTIONS: Each author contributed individually and significantly to this manuscript. All the authors (KCT, DS, CL, JFMF, and ACPC) participated in the literature review, writing, and revising of the manuscript as well as the study's intellectual concept.

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