



ORIGINAL ARTICLE

Birth weight and its association with blood pressure and nutritional status in adolescents^{☆,☆☆}

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KEYWORDS

Birth weight;
 Body mass index;
 Waist circumference;
 Height;
 Blood pressure

Abstract

Objective: The management of children with low birth weight is not the same in countries with different resources. The authors assessed the association of birth weight with blood pressure and nutritional status in a representative sample of adolescents from a Brazilian state, aiming to identify possible consequences of these differences.

Methods: A cross-sectional school-based study was conducted with adolescents (12–18 years) enrolled in public and private schools. Birth weight, office blood pressure (OBP), home BP (HBP) measurements, and nutritional status (body mass index [BMI], height z-score for the age, and waist circumference [WC]) were assessed. The association of birth weight with the outcomes (BP, height, BMI, and WC) was studied through univariate and multivariable linear regression models.

Results: A total of 829 adolescents with a mean age of 14.6 ± 1.62 years were included; 43.3% were male, and 37.0% from private schools. The prevalence of low birth weight was 8.7%. Mild low height prevalence was higher among those adolescents with low/insufficient birth weight when compared to those with normal/high birth weight (11.7 vs. 4.2%; $p < 0.001$). In the multiple linear regression analysis, for each increase of 100 g in birth weight, height increased by 0.28 cm (95% CI: 0.18–0.37; $p < 0.01$). Birth weight did not influence OBP and HBP, BMI, or WC of adolescents.

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58**PALAVRAS-CHAVE**

Peso ao nascer;
Índice de massa corporal;
Circunferência da cintura;
Estatura;
Pressão arterial

Conclusions: Birth weight was directly associated to height, but not associated to BP, BMI, and WC in adolescents from an urban area of a developing country.

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Peso ao nascer e sua associação com pressão arterial e estado nutricional em adolescentes

Resumo

Objetivo: O manejo de crianças com baixo peso ao nascer não é o mesmo em países com diferentes recursos. Investigamos a associação do peso ao nascer com a pressão arterial e o estado nutricional em uma amostra representativa de adolescentes de uma capital brasileira com o objetivo de identificar possíveis consequências destas diferenças.

Métodos: Estudo transversal de base escolar conduzido com adolescentes (12-18 anos) matriculados em escolas públicas e privadas. Investigou-se o peso ao nascer, a pressão arterial, e o estado nutricional, por meio do índice de massa corporal, do escore z de estatura para idade e da circunferência da cintura.

Resultados: Um total de 829 adolescentes com uma idade média 14.6 ± 1.62 anos foram incluídos, 43.3% do sexo feminino e 37.0% de escolas privadas. A prevalência de baixo peso ao nascer foi 8.7%. Baixa estatura leve foi mais prevalente nos adolescentes com peso ao nascer baixo/insuficiente ($11.7 \times 4.2\%$ - $p < 0.001$). Na análise de regressão linear múltipla, para cada aumento de 100g no peso ao nascer, a estatura aumentou em 0.28 cm (IC 95% = 0.18-0.37; $p < 0.01$). O peso ao nascer não influenciou a pressão arterial (casual e residencial), o IMC e a CC dos adolescentes.

Conclusões: O peso ao nascer esteve diretamente associado à altura, mas não associado à PA, IMC e CC em adolescentes de uma área urbana de um país em desenvolvimento.

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Introduction

The hypothesis of fetal origin of diseases or “programming” was first proposed by Barker, in 1990.¹ The main concept of this hypothesis is that the stress caused by fetal malnutrition, whose main biomarker is low birth weight (LBW), would inalterably modify the physiology or metabolism of an organ, increasing disease susceptibility in adult life.

Undoubtedly, uterine life is a critical period of development, due to rapid growth, cellular differentiation, and functional maturation of the organs. These rather sensitive processes would be particularly susceptible to alterations in the nutrient medium.¹

Birth weight is an important health indicator that reflects the social and economic conditions of women during pregnancy. Together with prematurity, birth weight is the main factor associated with neonatal death in Brazil. Babies with LBW present greater morbidity and mortality in the first year of life.²

LBW children (BW <2500g) can be born at term or before term, and have varying degrees of social and medical risk. Because this is not a homogeneous group, patients have a broad spectrum of growth, health, and developmental outcomes. While the vast majority of LBW children present normal outcomes, as a group they generally have higher rates of subnormal growth, illnesses, and neurodevelopmental problems.³

Recent studies showed that individuals with LBW due to inadequate intrauterine development are prone to developing hypertension, obesity, and low height, among other conditions, in late stages of life.⁴⁻⁶

Even though the association of LBW with a number of conditions has been demonstrated in different contexts,⁷⁻⁹ the mechanisms behind these associations are still not completely understood and need to be more investigated.¹⁰ Furthermore, few publications in middle-income countries focused on this matter. Considering that the management of LBW children is not the same in countries with different resources, research conducted in these countries can help to identify the outcomes related to LBW in adolescence and adult life.

Due to the scarcity of studies on fetal programming of diseases in middle-income countries such as Brazil, particularly considering the youth population, this article aimed to assess the association of birth weight with blood pressure (BP) and nutritional status in a representative sample of adolescents from a Brazilian state capital.

Methods

A cross-sectional school-based study was conducted with a representative sample of adolescents enrolled in public and private schools of Goiania, a state capital in the Midwest region of Brazil. The study population was composed by

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