

Birth weight and maternal socioeconomic circumstances were inversely related to systolic blood pressure among Afro-Caribbean young adults

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Abstract

Objectives: In this study, we examined the effects of birth weight (BWT) and early life socioeconomic circumstances (SEC) on systolic blood pressure (SBP) and diastolic blood pressure (DBP) among Jamaican young adults.

Study Design and Setting: Longitudinal study of 364 men and 430 women from the Jamaica 1986 Birth Cohort Study. Information on BWT and maternal SEC at child's birth was linked to information collected at 18–20 years old. Sex-specific multilevel linear regression models were used to examine whether adult SBP/DBP was associated with BWT and maternal SEC.

Results: In unadjusted models, SBP was inversely related to BWT z-score in both men (β , -0.82 mm Hg) and women (β , -1.18 mm Hg) but achieved statistical significance for women only. In the fully adjusted model, one standard deviation increase in BWT was associated with 1.16 mm Hg reduction in SBP among men [95% confidence interval (CI): 2.15, 0.17; $P = 0.021$] and 1.34 mm Hg reduction in SBP among women (95% CI: 2.21, 0.47; $P = 0.003$). Participants whose mothers had lower SEC had higher SBP compared with those with mothers of high SEC (β , 3.4–4.8 mm Hg for men, $P < 0.05$ for all SEC categories and 1.8–2.1 for women, $P > 0.05$).

Conclusion: SBP was inversely related to maternal SEC and BWT among Jamaican young adults. © 2015 Elsevier Inc. All rights reserved.

Keywords: Birth weight; Fetal growth; Blood pressure; Socioeconomic factors; Young adult; Jamaica; Black; Caribbean

1. Introduction

Population-based studies conducted in the Caribbean region have consistently shown that there is a high prevalence of chronic noncommunicable diseases (NCDs) and their risk factors and this has been increasing for the last 40 years

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[1,2]. In Jamaica, the prevalence of hypertension was approximately 25% in 2008 and had increased from an estimated 20% in 2001 [3,4]. Of note, the prevalence of hypertension among 15–24 year olds has been estimated to be 6% [3]. Prehypertension is also highly prevalent among youth, ranging between 20% and 30% [3,5].

Early life factors are important predictors of hypertension and other NCDs in adults [6–10]. Barker [8,11], using data from birth cohorts in the United Kingdom, was the first to demonstrate an inverse relationship between measures of intrauterine growth, chiefly birth weight, and the occurrence of cardiovascular disease, type 2 diabetes, and dyslipidemia in middle-aged adults. These findings have been replicated in several high-income countries [7,10,12].

Socioeconomic circumstances (SEC), including poverty, low education attainment, and low occupational social

What is new?**Key findings**

- This study reports an inverse relationship between birth weight and systolic blood pressure (SBP) among young adults 18–20 years old in Jamaica. Low maternal occupational social class was associated with higher SBP, independent of the effect of birth weight and current body size, although statistically significant only in men.

What this adds to what was known?

- This is the first study to look at the relationship between early life factors and blood pressure (BP) in Jamaican young adults and the first to show an association between early life socioeconomic circumstances and BP in young adults in an African-Caribbean setting. The study corroborates findings from studies in high-income countries and adds to the sparse data from low- and middle-income countries.

What is the implication and what should change now?

- Early life determinants should be considered when investigating the etiology of hypertension and should be included in prevention programs for hypertension.

class, are key determinants of NCDs [13–16]. Over 80% of NCD, deaths occur in low- and middle-income countries (LMIC) and the most deprived are at the highest risk of developing the NCDs [17]. Early life SEC have also been shown to have adverse effects on children's health, which may have lifelong consequences as a result of the interactions between socioeconomic, environmental, psychosocial, and biological factors [6].

With regard to blood pressure (BP), early life influences including, intrauterine growth, placental size, postnatal growth, and perinatal SEC, have been found to be important determinants [8,10,13]. Previous studies from Jamaica that examined associations between BP and birth weight and other early life factors in children up to age 16 years showed an inverse relationship between birth weight and systolic BP [18–20].

Jamaica, like other LMICs, is experiencing a rapid epidemiologic and nutritional transition, with increasing urbanization. The prevalence of low birth weight is over 10%, and childhood undernutrition remains of concern [21,22]. An understanding of the impact of early life factors on NCDs in a LMICs setting is important to guide efforts to ameliorate the NCD burden.

In this article, we develop on previous analyses, this time using a cohort of Jamaican children born in 1986, to

investigate the influence of birth weight and maternal SEC on BP in early adulthood (18–20 years old).

2. Methods*2.1. Study design and sample*

The Jamaica 1986 Birth Cohort is a longitudinal study of a subset of children born between September and October 1986 and enrolled in the Jamaica Perinatal Morbidity and Mortality Survey [24]. Details on the design and methods have been published previously [23–25]. In 2005–2007 participants living in the parishes of Kingston, St. Andrew and St. Catherine were invited to participate in a follow-up evaluation [23,25]. The cohort was identified from records available for 1,634 of these children. Of the 1,212 children with whom we made successful contact, 902 were enrolled in the follow-up evaluation when they were 18–20 years old. Analyses for this article were limited to participants who were singleton births who had complete data on birth weight and BP. Ninety-eight participants with no birth weight data, nine from multiple gestation pregnancies, and one with no BP data were therefore excluded, resulting in a final sample of 794 participants. The study protocol was approved by the University of the West Indies/Faculty of Medical Sciences Ethics Committee. Written informed consent was obtained from each participant before examination.

*2.2. Measurements**2.2.1. BP and exposures at 18–20 years old*

BP was measured using a mercury sphygmomanometer, on the right arm, after the participant had been seated for at least 5 minutes and followed a standardized protocol [26]. The mean of the last two of three measurements was used for analysis. Height was measured using a portable stadiometer and weight using a calibrated portable digital scale.

Data on the participants' SEC and lifestyle were collected in interviewer-administered questionnaires. Education level was coded in three categories—primary, secondary, and college/university—whereas employment status was also coded in three categories—employed, unemployed, or student. Leisure time physical activity (PA) focused on PA in the week before the study visits. Participants were classified into three groups—No PA, ≤ 3.5 hours PA, and > 3.5 hours PA.

2.2.2. Exposures at birth: maternal and own data at birth

Mothers and their babies were seen within 48 hours of the birth. Information on the mother's last menstrual period (used to derive gestational age of child at birth), parity, age, height, and SEC (education level, employment, and usual occupation) were obtained from questionnaires administered during face-to-face interviews. Maternal occupation was coded using the Jamaica Standard Occupational

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