The association between weight at birth and prevalence of cardiovascular disease in middle-age: the ARIC Study

Birthweight and CVD

Kathy Rose, Al Tyroler, Joe Coresh, Aaron Folsom, Marion Wofford

Kathryn Rose, Ph.D.
Cardiovascular Disease Group
University of North Carolina at Chapel Hill
137 E. Franklin Street
NationsBank Plaza, Suite 306
Chapel Hill, NC 27514

Phone: (919) 966-1933 Fax: (919) 966-9800
Email: kathy.rose@sph.unc.edu

Analysis would begin after the preliminary analyses for the related manuscript on birth weight and CVD risk factors has been completed. It is anticipated that an initial draft of this manuscript would be ready for review by co-authors during the late Spring, 2000.

The Barker Hypothesis purports that unfavorable fetal exposures in utero (e.g., inadequate fetal nutrition) lead to higher rates of chronic diseases in adulthood (1). In support of this hypothesis, he cites a large number of studies demonstrating inverse associations between infant birth weight and CVD-related outcomes (e.g., 2-5). However, there is considerable debate in the literature as to the plausibility of the Barker hypothesis.
(e.g., 6,7), as much of the data that supports his hypothesis has come from ecological studies or has not adequately addressed issues of confounding. Nevertheless, there is a growing body of epidemiologic evidence, which report findings consistent with this hypothesis. Investigators from the Nurses Health Study have reported an independent, inverse association of birth weight, ascertained in adulthood, with nonfatal cardiovascular disease (8), while Swedish investigators recently reported an inverse association of birth weight with fatal CVD (9).

This association is at least in part thought to be partially mediated through cardiovascular risk factors, which have been found to be associated with birth weight including diabetes (10,11), hypertension (12,13), and the multiple metabolic syndrome (14). However, in the studies reviewed associations persisted after controlling for such factors (8,9). Recent work suggests that associations of birth weight with CVD-related outcomes may be modified by adult obesity status, with inverse associations being stronger or limited to those who are obese (14).

Thus, the purpose of the current study will be to examine the association between birth weight and the prevalence of CVD (CHD, stroke), both ascertained at visit 4. We also will determine the extent to which such associations, if extant, are explained by CVD-risk factors previously identified as being related to low birth weight (e.g., diabetes, hypertension, dyslipidemia, obesity, childhood SES).

We recognize that there may be concerns about the validity of retrospectively obtained, self-reported birth weight data. However, several epidemiologic studies (Nurse’s Health Study, Rancho Bernardo Study) have demonstrated an association with similarly obtained retrospective, self-reported birth weight data. Also, in the Nurses Health Study a validation study was conducted and found that self-reported birth weight correlated highly with both maternal report and birth records (Troy).

5. **Main Hypothesis:**

There will be an inverse association of low birth weight with prevalence of stroke, CHD, and all CVD.

Inverse associations will be attenuated after controlling for childhood SES.

Inverse associations will be partly mediated by CVD risk factors (hypertension, diabetes, dyslipidemia)

6. **Data (variables, time window, source, inclusion/exclusions):**

All analyses will be restricted to the subset of baseline participants who attended the Visit 4 exam, as participants’ birth weight was queried only at this exam. Outcome (stroke and CHD) and most covariate (diabetes, hypertension, dyslipidemia, BMI, WHR, early childhood education, parental history of CVD-related conditions (e.g., hypertension, diabetes, CVD)) data will also be obtained from the Visit 4 examination. Additional
covariate data (age, adult level of education and income) will be ascertained from the Visit 1 examination.

Logistic regression analyses will be used to analyze the association between birth weight and CHD and stroke. We will first consider all prevalent disease and then follow up with analysis that is restricted to validated (incident) cases. Variables considered as potential effect modifiers/ confounders include BMI, waist-hip ratio, age, ethnicity, gender, current and early childhood socioeconomic status, parental history of CVD-related conditions (diabetes, hypertension, heart attack, stroke), diabetes, serum cholesterol (LDL, HDL, triglycerides), and hypertension.
References


