

Short Communication

Health-care access and weight change among young adults: the Coronary Artery Risk Development in Young Adults (CARDIA) Study

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Abstract

Objective: Health-care access is associated with improved control of multiple chronic diseases, but the association between health-care access and weight change is unclear. The present study aims to test the association between health-care access and weight change.

Design: The Coronary Artery Risk Development in Young Adults (CARDIA) Study is a multicentre population-based prospective study. Weight change was calculated at 3 and 13 years after CARDIA year 7 (1992–1993). Health-care access was defined as no barriers or one or more barriers to access (health insurance gap, no usual source of care, not seeking care due to expense). Intermediary variables evaluated included history of dieting and use of diet pills, meal replacements or weight-control programmes.

Setting: Four cities in the USA.

Subjects: Participants were aged 18–30 years at baseline (1985–1986). Analyses include 3922 black and white men and women with relevant data from CARDIA years 7, 10 and 20 (1992–1993, 1995–1996 and 2005–2006, respectively).

Results: Mean weight change was +2.22 kg (+4.9 lb) by 3 years and +8.48 kg (+18.7 lb) by 13 years, with no differences by health-care access. Being on a weight-reducing diet was not consistently associated with health-care access across examinations. Use of diet pills, meal replacements or organized weight-control programmes was low, and did not vary by health-care access.

Conclusions: Weight gain was high irrespective of health-care access. Public health and clinical approaches are needed to address weight gain.

Keywords
Health-care accessibility
Body weight change

Obesity contributes to increased risk for hypertension, diabetes and CVD^(1,2). Weight gain during adulthood further increases one's risk for these chronic diseases^(3–5). Physician acknowledgement of patients' overweight status and advice to lose weight increase the accuracy of patients' weight perceptions, attempts to lose weight and weight loss^(6–8). However, physicians continue to provide weight-related counselling at suboptimal levels^(9–11).

As health-care reform efforts seek to increase access to care, it is important to ascertain the effects these efforts will have on the health of the US population. Individuals with health-care access receive more preventive services,

have better blood pressure and diabetes control, and higher smoking cessation rates^(12–17). Less is known about the association between health-care access and longitudinal weight change. It is also unknown whether individuals with access to health care are more likely to undertake behaviours that might be expected to contribute to weight loss, such as dieting, using diet pills, using meal replacements or joining a weight-loss programme. Despite the potential for physician counselling to promote weight loss and maintenance through the intermediary variables described above, we hypothesize that access to regular health care is not associated with

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weight change in adults due to the multiple barriers that physicians face to providing weight-related counselling, including physician time constraints, lack of training and resources related to weight management, and the presence of competing demands related to urgent patient complaints^(18–20).

Methods

Study population

The Coronary Artery Risk Development in Young Adults (CARDIA) Study is a longitudinal study of CVD risk factors in 5115 young adults. Black and white individuals aged 18–30 years were recruited in 1985–1986 from Birmingham, AL; Chicago, IL; Minneapolis, MN; and Oakland, CA. The current paper used data from CARDIA years 7, 10 and 20 (1992–1993, 1995–1996 and 2005–2006), which included 81%, 79% and 72% of the initial cohort, respectively. Individuals without height, weight and health-care access data or who were pregnant in a given exam or had bariatric surgery were excluded. Of the 4073 participants who attended the CARDIA year 7 exam (1992–1993), 3922 had available data for analysis. The institutional review boards from each field centre and the coordinating centre approved the study annually.

Measures

Body weight and height were measured by CARDIA Study personnel using a calibrated balance beam scale and a vertical ruler according to standard procedures⁽²¹⁾. Short-term (3-year) and long-term (13-year) changes in weight were calculated as the difference between weight at CARDIA years 10 (1995–1996) and 7 (1992–1993), and years 20 (2005–2006) and 7 (1992–1993), respectively. Blood pressure, fasting glucose and medication use were measured according to standard procedures, and hypertension and diabetes were determined using standard cohort classifications⁽²²⁾. As detailed in prior publications⁽²²⁾, blood pressure was measured from participants in the seated position three times at intervals of 1 min; the average of the last two measurements was used to determine systolic and diastolic blood pressure. Fasting insulin was analysed with a RIA technique that used an overnight equilibrium incubation. Medication use was obtained via interview. Diabetes was determined based on a combination of measured fasting glucose levels (≥ 7.0 mmol/l) or self-report of oral hypoglycaemic medications or insulin⁽²²⁾. Hypertension was defined as systolic blood pressure of at least 140 mmHg, diastolic blood pressure of at least 90 mmHg or antihypertensive medication use⁽²³⁾.

Health-care access was represented by an ordinal variable which was derived via summation of three dichotomous variables related to patient-reported access barriers during the preceding 2 years: (i) health insurance

coverage gap; (ii) no usual source of care; and (iii) not seeking care due to expense. For ease of interpretation, health-care access was dichotomized as no barriers *v.* one or more barriers to access. In longitudinal analyses of weight change over 3 and 13 years, health-care access in CARDIA year 7 (1992–1993) was used. Cross-sectional analyses evaluating the association between health-care access and various intermediary variables utilized health-care access from CARDIA years 10 (1995–1996) and 20 (2005–2006) and assessed the following potential intermediary variables: dieting in the past 3 years (CARDIA year 10, 1995–1996) or 5 years (CARDIA year 20, 2005–2006) and use of diet pills, meal replacements and weight-control programmes in the preceding 6 months (CARDIA year 10, 1995–1996). Age, gender, race and educational status were obtained during the CARDIA year 7 exam (1992–1993).

Statistical analysis

Baseline characteristics between those with and without barriers to health-care access were compared using χ^2 and *t* tests. Multivariable linear regression tested the relationship between baseline health-care access and short- and long-term absolute weight change, adjusting for height, age, gender, race, educational status, hypertension and diabetes (from CARDIA year 7, 1992–1993). Analyses were duplicated using BMI change or percentage change in body weight instead of weight change. The possibility of effect modification by race and sex was evaluated, and none was identified. In an attempt to maximize statistical power, linear mixed modelling was used to determine whether weight varied as a function of health-care access, time or the relationship between time and access, adjusting for age, gender, race, educational status, hypertension and diabetes from all years. The χ^2 test was used to assess the relationship between health-care access and history of dieting, use of diet pills, meal replacements or weight-control programmes. These analyses were repeated using logistic regression controlling for gender. Analyses were performed using the STATA statistical software package version 10.0. Statistical significance was defined as $P < 0.05$.

Results

The sample was 54% female, 48% black and 71% had >12 years of education (Table 1). In CARDIA year 7 (1992–1993), the mean age and BMI were 32.0 (SD 3.6) years and 26.7 (SD 6.0) kg/m², respectively, and 4.7% of participants had hypertension and 1.5% had diabetes. Most (69%) participants reported no barriers to health-care access. Participants without barriers were more likely to be older, female and highly educated.

Participants gained 2.22 (SD 5.81) kg (4.9 (SD 12.8) lb) over 3 years and 8.48 (SD 10.3) kg (18.7 (SD 22.6) lb) over

Table 1 Participants' demographic information by health-care access*: the Coronary Artery Risk Development in Young Adults (CARDIA) Study, 1992–1993

Characteristic	All participants† (n 3922)		Participants with full health-care access (n 2714)		Participants with one or more barriers to health-care access (n 1208)		P value‡
	Mean or %	SD	Mean or %	SD	Mean or %	SD	
Age (years)	32.0	3.6	32.3	3.5	31.5	3.8	<0.001
Gender (% female)	53.9	–	56.8	–	47.4	–	<0.001
Race (% black)	48.2	–	48.5	–	47.4	–	0.54
Education >12 years (%)	71.0	–	74.5	–	63.1	–	<0.001
BMI (kg/m ²)	26.7	6.0	26.7	6.0	26.6	6.0	0.68
Hypertension (%)	4.7	–	4.8	–	4.7	–	0.96
Diabetes (%)	1.5	–	1.4	–	1.6	–	0.60

*Health-care access was represented by a dichotomous variable indicating either no barriers to access or one or more of the following barriers to access during the preceding 2 years: (i) health insurance coverage gap; (ii) no usual source of care; and (iii) not seeking care due to expense.

†The term 'participants' refers to the full sample of participants with data available for analysis. Of these 3922 participants, 3488 participants had data available for analysis for 3-year weight change and 3107 participants had data available for analysis for 13-year weight change.

‡Calculated using unpaired *t* tests and χ^2 tests comparing those with to those without full health-care access.

13 years of follow-up. In multivariable linear regression analyses, weight gain did not differ between those with and without barriers to health-care access in CARDIA year 7 (1992–1993; 3-year weight gain: $\beta = 0.08$, 95% CI $-0.51, 0.68$; 13-year weight gain: $\beta = 0.04$, 95% CI $-1.08, 1.16$). Using BMI change or percentage change in body weight instead of absolute weight change yielded similar findings. The findings of the absence of an association between health-care access and weight were confirmed using linear mixed models.

In cross-sectional analyses, compared with participants who had barriers to health-care access in the preceding 2 years, those with no barriers to health-care access were more likely to report dieting in the preceding 5 years at CARDIA year 20 (2005–2006; 33.0% *v.* 25.5%, $P < 0.001$) and marginally more likely to report dieting in the preceding 3 years at CARDIA year 10 (1995–1996; 23.1% *v.* 20.4%, $P = 0.08$). Use of other strategies for weight control in the preceding 6 months was low overall (diet pills 2.3%, meal replacements 5.3%, organized weight-control programme 2.4%), and there were no meaningful differences by health-care access (as assessed in CARDIA year 10 (1995–1996)). Further adjustment for gender did not substantially influence the findings.

Discussion

In our cohort of early middle-age adults, weight gain over 13 years was substantial and was unrelated to health-care access. Individuals without major barriers to health-care access were more likely to report dieting, although this difference was modest and not consistently identified in all years examined. Use of diet pills, meal replacements or organized weight-control programmes was uniformly low. To our knowledge, the present study is the first to evaluate the relationship between health-care access and weight change among a population-based cohort.

One prior study of myocardial infarction survivors suggested that having health insurance was associated with a 2% greater weight loss at 1 year post myocardial infarction⁽²⁴⁾. However, the magnitude of the difference was small and the follow-up duration was short. Further, physicians may be more likely to provide weight-related counselling to overweight myocardial infarction survivors than to overweight but otherwise healthy younger adults.

Compared with other chronic diseases (e.g. hypertension) for which an association between health-care access and disease control has been described^(12,14,16,17), the management of obesity requires greater patient involvement. Possible mechanisms to explain the lack of an association between health-care access and weight change include: (i) access to health care does not imply health-care utilization; (ii) busy clinicians may often not provide weight-related counselling^(9–11); (iii) successful weight-loss programmes require regular and long-term contact⁽²⁵⁾; and (iv) patients may not comply with recommended strategies for weight loss. The inconsistent finding between health-care access and history of dieting at years 10 and 20 may be explained by: (i) younger adults less often seeking medical care⁽²⁶⁾; and (ii) physicians more frequently providing weight-related counselling to older adults with weight-related co-morbidities⁽²⁷⁾. It is also possible that there may have been some dilution in the results observed due to the fact that while the time frames assessing health-care access and dieting were overlapping at both time points, they were not exactly concordant.

Strengths of the study include the use of a large population-based cohort with long-term follow-up and the fact that height and weight were measured by study personnel. Although measures of access collected by the CARDIA Study are similar to those used by other investigators^(12–14,16), our study is limited by the lack of data regarding how often participants saw physicians, if physician advice was given for weight loss and if dieting

or other weight-management strategies were undertaken by recommendation or supervision from a health-care provider. Thus, it is not possible to infer whether the lack of an association between health-care access and weight change could be due to infrequent contacts with physicians, failure of physicians to initiate weight-related management or the ineffectiveness of the treatment provided. We also acknowledge that weight change also may be influenced by a myriad of other background factors, including national agricultural policies (i.e. availability and affordability of healthy foods) and one's physical environment (e.g. access to safe places to exercise), which were beyond the scope of the paper.

As increasing demands are being placed on the health-care system to address obesity, the present study highlights that health-care access alone is not sufficient to prevent weight gain. Multidimensional approaches to addressing weight gain are needed, with a focus on reforming efforts both in the clinical and public health arenas.

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