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Title: Differences in the association of cardiovascular risk factors with education: a comparison of Costa Rica (CRELES) and the United States (NHANES)

David H. Rehkopf, Univesity of California, San Francisco, Department of Epidemiology & Biostatistics

William H. Dow, University of California, Berkeley, Department of Health Policy and Management

Luis Rosero-Bixby, Universidad de Costa Rica, Centro Centroamericano de Poblacion

Address for correspondence:

David H. Rehkopf, ScD, MPH
Department of Epidemiology & Biostatistics
University of California, San Francisco
185 Berry Street, Lobby 3, Suite 6600
San Francisco, CA 94107

Phone: 415-514-8114
e-mail: drehkopf@gmail.com

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Abstract

Background Despite different levels of economic development, Costa Rica and the United States have similar mortality rates among adults. However, in the United States there are substantial differences in mortality by educational attainment, and in Costa Rica there are only minor differences. This contrast motivates an examination of behavioral and biological correlates underlying this difference.

Methods We used data on adults aged 60 and above from the Costa Rican Longevity and Healthy Aging Study (CRELES) (n=2827) and from the United States National Health and Nutrition Examination Survey (NHANES) (n=5607) to analyze the cross-sectional association between educational level and the following risk factors for cardiovascular disease (CVD): ever smoked, current smoker, sedentary, high saturated fat, high carbohydrates, high calorie diet, obesity, severe obesity, large waist circumference, HDL cholesterol, LDL cholesterol, triglycerides, hemoglobin A1c, fasting glucose, C-reactive protein, systolic blood pressure, and BMI.

Results There were significantly less hazardous levels of risk biomarkers at higher levels of education for more than half (10 out of 17) of the risk factors in the United States, but for less than a third of the outcomes in Costa Rica (5 out of 17).

Conclusions Our results are consistent with the context specific nature of educational differences in risk factors for CVD and with a non-uniform nature of association of CVD risk factors with education within countries. Our results also demonstrate that social equity in mortality is achieved without uniform equity in all risk factors.

Introduction

While in developed western countries (1, 2) and some non-western countries(3) there is generally an association of lower educational attainment with greater risk of mortality, others have described the historically contingent and contextually specific nature of such associations (4). A recently documented example of a different mortality pattern with respect to educational attainment is among older individuals in Costa Rica. While there are higher rates of mortality among children of mothers with less than a primary school education (5) there are relatively minor associations between mortality and education in Costa Ricans age 60 and above (6). While education differentials in mortality are generally smaller at older ages (7), recent analysis in the United States of similar aged individuals reveal substantial differentials by education, with mortality rates 5-6% higher per year for each year less of education (8).

Costa Rica is a case of particular interest because of its historic emphasis on progressive social and health sector programs. The country began investing in female education in the late 19th century, abolished the army in the mid 20th century, invested heavily in public health initiatives such as clean water, has strongly promoted primary care initiatives in its medical sector, and adopted national health insurance in the 1970s. Costa Rica's high overall life expectancy (higher even than the United States) has been linked to its social investments (9), but until the recent Costa Rican Longevity and Healthy Aging Study (CRELES) little data has been available to understand why there is a lack of social class differences in older adult mortality in Costa Rica.

There have been several hypotheses for explaining the aggregated general associations of adult mortality and education. One of these is the theory of social conditions as fundamental causes of disease (10, 11). This theory posits that socioeconomic resources, for example as measured by educational attainment, affect multiple risk factors for diseases. This is posited to occur through the ability of people to use resources to avoid multiple causes of risk – and implies some similarity of the association of education with multiple pathways to disease outcomes. Other theories involve the primacy of factors including technical progress in medical care (12, 13), the importance of time preferences (14, 15), social rank (16) or income inequality (17). Within each of these proposed drivers of socioeconomic heterogeneity in mortality, proponents generally do not focus on particular pathways, but imply more general effects on disease processes. An alternative explanation of the mortality education association is that a more complex pattern of the association of education and biological pathways exists. Where education associations with risk factors are not uniform but rather only on balance create the educational differences observed for mortality. Whether data are more consistent with either of these potential explanations has important implications for policies to decrease the link between lower levels of education and higher rates of mortality.

We focus here on risk factors for cardiovascular disease (CVD) both because 1) a substantial part of the education disparities in mortality in the United States are from CVD (18), 2) roughly 40% of deaths at ages 60 and over in Costa Rica are due to cardiovascular diseases (19), and 3) risk factors are relatively well characterized. While CVD is a heterogeneous category and there are some differences in the risk factors for the specific causes of death within it (e.g. early life exposures for hemorragic stroke)(20), known risk factors explain the majority of cases of CVD.(21, 22)

Our approach to understanding the different associations of education and mortality in Costa Rica and the United States is to examine the relative strength of education gradients in risk factors for CVD, both biological and behavioral. Our choice of risk factors was guided by the published guidelines of the American Heart Association (23), the American College of Cardiology (24, 25), and the World Health Organization (26). We examined risk factors that together explain the majority of CVD risk (23, 27), and there are not substantial variations between countries in the risk factors predicting CVD (28). While many of these risk factors are correlated, we include each of these risk separately because of potentially different associations with education. Exposures over the life course may effect levels of certain biological risk markers (29-32), in addition to current behaviors (33). Thus while our analysis of behavioral risk factors focuses on current assessment of exposures, the biomarkers and anthropometric measures should be interpreted as the cumulative result of exposures over the lifespan (34).

Methods

Samples

Data from Costa Rica is from the Costa Rican Longevity and Healthy Aging Study (CRELES), a nationally representative, probabilistic sample of adults aged 60 and over (from a population of approximately 350,000) selected from the 2000 census database.(35) A selected sub-sample of this population (n=1329 men, n=1498 women) with over-sampling of the oldest old completed a survey in their household between November 2004 and September 2006 which is the basis of the analytic sample. This sub-sample had the following non-response rates: 19% of individuals were deceased by the contact date, 18% could not be found, 2% had moved and 4% rejected the interview. Among those interviewed, 95% provided a fasting blood sample.

Data from the United States is from the National Health and Nutrition Examination Survey (NHANES) 1999-2004, restricted to adults aged 60 and over (n=2411 men, n=3196 women). This cross-sectional data is representative of the non-institutionalized population of the United States. NHANES follows a four stage sampling procedure where the primary sampling units are counties, within which city blocks are selected. Within these blocks households are then randomly selected, and then individuals are drawn at random from designated age-race/ethnicity-sex subdomains.(36)

This research was approved by Human Subject committees at Universidad de Costa Rica and University of California, Berkeley.

Demographic, health related behaviors and dietary measures

Our primary exposure of interest is attained level of formal education. Since the absolute level of educational attainment has different social and economic meaning in each country, it does not make sense to use the same categories of education. For Costa Rica, educational attainment was categorized into three groups: less than three years of education, from three to six years of education (elementary school comprises six grades), and at least one year of high school. For the United States, we use the educational categories of less than high school, high school or greater than high school. We performed sensitivity analyses with Costa Rican educational categories of none, one to five years of education (some primary) and six or more years (completed primary) and findings were generally similar (results shown suplemental data Tables S1 and S2).

In both NHANES and CRELES ever smoked was assessed by the question "Have you smoked more than 100 cigarettes or cigars in your life?" and current smoking was assessed by the question "Do you smoke now?" In CRELES, sedentary behavior was defined as participants responding "no" to the question "In the last 12 months, did you exercise regularly or do other physical rigorous activities like sports, jogging, dancing, or heavy work, three times a week?" In NHANES, sedentary behavior was assessed by whether individuals reported physical activity less than 13 times in the last 30 days, and answered "No" to the question of "you do heavy work or carry heavy loads" as an average level of physical activity each day.

CRELES collected dietary data using a modified version of a food-frequency questionnaire (FFQ) that was developed and validated specifically to assess nutrient intake among the Costa Rican adult population (37, 38). Dietary averages in NHANES were based on calculations from two 24 hour dietary recalls (39). Standard cut points associated with differential risk of cardiovascular disease were used to create dichotomous variables as follows: high saturated fat diet (> 40 grams per day), high carbohydrate diet (> 200 grams per day) and high calorie diet (> 3000 kcal/day).

Anthropometric and biomarker outcomes

For anthropometric measures we examine BMI (as continuous), obese (BMI > 30), severely obese (BMI > 40) and large waist (> 102 cm among men, > 88 cm among women). In both studies height and weight were measured and waist circumference was measured at the midaxillary line

The seven biomarkers examined were high density lipoprotein cholesterol (HDL cholesterol), low density lipoprotein cholesterol (LDL cholesterol), triglycerides, glycosylated hemoglobin (hemoglobin A1c), fasting glucose, systolic blood pressure and C-reactive protein (CRP). All biomarkers were measured using similar methods in both countries. Sitting systolic blood pressure was measured twice in CRELES (40) and up to four times n NHANES.(41) When multiple blood pressure readings were taken the first reading was excluded from the average (if only two measures were taken the second reading was used).(41)

Statistical analysis

All analyses accounted for over-sampling and clustered sampling using the survey package in STATA 10. Sampling weights and clustering were at the PSU level (n=49) in NHANES and at the health area level in CRELES (n=60). Continuous outcomes were analyzed using linear regression and dichotomous outcomes were analyzed using logistic regression, controlling for age and age squared. Because there were statistically significant interactions between education and gender for a number of outcomes in both countries (data not shown, available upon request), all analyses are presented stratified by gender. In NHANES, analyses of blood glucose, LDL cholesterol and triglycerides were examined only in the randomly assigned fasting sub-sample (n=1016 men, n=1065 women).

Results

Table 1 shows the distribution of demographic characteristics, health behaviors, dietary averages, anthropometric measures and prevalent health conditions in CRELES and NHANES by gender.

Table 1: Demographic and health related characteristics of Costa Rica (CRELES) and the United States (NHANES) (column proportions)

	Costa Rica		United States	
	n=1329	n=1498	n=2411	n=3196
	men	women	men	women
demographic				
age				
60-64	0.31	0.29	0.26	0.24
65-74	0.42	0.41	0.44	0.40
75-84	0.21	0.22	0.24	0.29
>85	0.06	0.07	0.06	0.08
education (Costa Rica/United States)				
<3 years elementary / <high school	0.28	0.28	0.29	0.31
> 3 years elementary / high school	0.49	0.52	0.24	0.32
at least 1 year high school / >high school	0.23	0.20	0.46	0.36
married or partner	0.77	0.47	0.77	0.46
health behaviors				
current smoker	0.17	0.04	0.14	0.10
ever smoked	0.68	0.21	0.69	0.41
not physically active	0.60	0.77	0.63	0.71
diet				
high saturated fat diet (>40 g/day)	0.16	0.12	0.13	0.04
high carbohydrate diet (>400 g/day)	0.20	0.11	0.07	0.02
high calorie diet (>3000 kcal/day)	0.16	0.09	0.09	0.02
anthropometric				
obese (BMI>=30)	0.23	0.36	0.36	0.40
severely obese (BMI >=40)	0.07	0.11	0.10	0.14
waist (>102 cm men, > 88 cm women)	0.25	0.67	0.59	0.75
prevalent health conditions				
hypertension (sys/diastolic > 140/90)	0.55	0.60	0.35	0.50
hypercholesterolemia (TC:HDL>5.92)	0.33	0.26	0.49	0.45
diabetes (HbA1c > 6.5%)	0.18	0.23	0.19	0.15

Among health behaviors related to cardiovascular disease mortality, Costa Rica has a lower percent of current smokers among women. The United States has a much higher percentage of women who had ever smoked. Men and women in the United States were more likely to be obese, severely obese and have a larger waist circumference, with higher proportions of each among women than among men in both countries. In the

United States there were lower levels of hypertension, higher levels of hypercholesterolemia, and lower levels of diabetes (among women).

Figure 1 shows a comparison (NHANES – solid lines, CRELES – dashed lines) of the population distribution of seven biological risk markers for CVD. All median differences shown are statistically significantly different at the alpha = 0.05 level except for LDL cholesterol. Costa Ricans show substantially higher triglycerides and systolic blood pressure and substantially lower BMI. The overall distribution of these biological risk factors are generally similar between NHANES and CRELES, with the exception of an upwardly shifted distribution of systolic blood pressure in CRELES, and a higher right hand tail of BMI distribution in the United States.

Figure 2 presents odds ratios of smoking, physical activity, diet and anthropometric measures by educational attainment, controlling for age, age-squared and stratified by gender. The odds ratios (OR) can be interpreted as the ratio of the odds of the outcome in either the middle or highest education category as compared to the lowest education category. In Costa Rica, there was a higher proportion of individuals with a high saturated fat diet among the most educated. Among Costa Rican men, the most educated were more likely to be obese and more likely to have a large waist circumference. Among women, there was a lower probability of lifetime smoking and being sedentary among the more educated and a higher probability of having a high calorie diet. In the United States, more educated individuals were significantly less likely to be sedentary. Among men in the U.S., more educated were less likely to be current smokers, less likely to be lifetime smokers, but more likely to have a high carbohydrate and a high calorie diet. Among women, more educated women were less likely to be obese and have a large waist circumference.

Figure 3 shows differences in levels of eight biological risk factors for CVD by educational attainment, controlling for age, age-squared and stratified by gender. The plotted betas from linear regression models can be interpreted as absolute differences in the level of the biomarker among those in the middle or highest educational categories as compared to the lowest education category. In Costa Rica, higher educational attainment is associated with lower levels of LDL among men, and lower levels of hemoglobin A1c and systolic blood pressure in women. Among men in the United States, there are higher levels of triglycerides among men in the middle education category, and lower levels of hemoglobin A1c. Among women in the United States, among the more educated there were higher (lower risk) levels of HDL cholesterol, lower levels of hemoglobin A1c, lower levels of fasting glucose, lower levels of C-reactive protein, and lower levels of BMI.

Thus overall there were significantly less hazardous levels of risk biomarkers at higher levels of education for more than half (10 out of 17) of the risk factor outcomes in the United States. This was true for less than a third of the outcomes in Costa Rica (5 out of 17). In Costa Rica higher levels of education were associated with higher risk levels for approximately one quarter (4 out of 17) of the risk factor outcomes, while this was the case for 3 out of 17 risk factors in the United States.

Discussion

We found that there was not a uniform lack of education differentials of risk factors in Costa Rica nor a universal presence of education differentials in risk factors in the United States. Instead we found education differentials in the U.S. driven by lower levels of current smoking, lifetime smoking, sedentary behavior and hemoglobin A1c among more educated men and lower levels of sedentary behavior, obesity, large waist circumference, hemoglobin A1c, fasting glucose, C-reactive protein, BMI and higher HDL cholesterol among more educated women. In Costa Rica, some important risk factors (e.g. smoking, higher systolic blood pressure and sedentary) are more prevalent among the less educated, but other important risk factors such as obesity (among men), or overall high calorie and saturated fat diets (among women) are more prevalent among those with less education. This combination of risk factors may on balance act to create the observed education-mortality differences between these two countries. The differential importance of education depended on country context. Among the 17 gender stratified outcomes examined, the only similarly statistically significant education differentials we observed were for sedentary behavior and hemoglobin A1c among women. These observations are not consistent with universal effects associated with educational attainment. In addition, at least in each of these two countries, there is little evidence for universal associations between education and risk factors for CVD.

There are a several limitations to this descriptive study. Multiple risk factors may interact (24), and the clustering of risk factors may be different in each country. While there may be other biological pathways with different education associations that we don't examine,,known risk factors explain the majority of absolute levels of CVD as well as socioeconomic differences (21, 22, 42, 43). It is unlikely that racial/ethnic minorities in the U.S. are the reason for the differences in the association of education with risk factors as we repeated our analysis using only the non-Hispanic white population of the United States, and results did not change substantively (data not shown). We also repeated our analysis with alternative educational categories in Costa Rica, which did not meaningfully change our overall findings (shown in supplemental data, tables S1 and S2). The time periods of these data differ slightly (1999-2004 in the U.S. and 2004-2006 in Costa Rica), but evidence suggests that socioeconomic differences are not changing rapidly enough for this to influence our comparison.(44) Data from Costa Rica was available only for individuals age 60 and above, so inference should not be made outside of this age range. Results depend on our measure of socioeconomic position, with education more likely to capture early life exposures.(45, 46) Finally, measures of sedentary behavior and dietary intake differed between surveys, so these comparisons should be interpreted with some caution.

Some prior work has also sought to understand international differences in risk factors underlying CVD (2, 47). In contrast with our results, education differences in CVD risk factors in a younger population (age 40-70) in the United States and England, qualitatively reveals similar education differences for dichotomized measures of HbA1c, blood pressure, C-reactive protein, fibrinogen and HDL cholesterol, current smoking, ever smoking and obesity (47). More similar to our findings a study of 11 European Union countries found substantial educational differences in overweight among men (odds ratios ranging from 0.87 to 2.00 for low education vs. all other categories) and current smoking among women (odds ratios ranging from 0.32 to 1.94 for low education vs. all other categories) (48).

Prior examinations of socioeconomic differences in CVD risk factors have also found similar gender differences (49, 50) that may be due to gender (a social construct relating to culturally influenced differences between men and women) or sex-linked biology.(51) These gender differences are consistent with a context specific importance of education by gender. For example, we found different associations between education and obesity by gender (a significant positive association among men in Costa Rica, and a significant negative association among women in the United States) that are unlikely to be explained solely by sex-linked biology.

The motivating question was to determine whether risk factor and education associations were absent in Costa Rica and present and consistent across examined factors in the United States, or whether there was a balance of different types of risk factor associations with education that lead to the observed mortality-education associations. Our findings are consistent with the latter. This is less consistent with any one factor having a majority influence on educational differences in mortality. Nevertheless, a number of theories may still be relevant, but based on our findings, the effects may be specific to particular pathways. While this complexity may be daunting for efforts to reduce income disparities in mortality, a lack of universal associations with education also implies potentially more tractable approaches of focusing prevention and treatment on the specific risk factors most responsible for differences in disparities.

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What this paper adds
What is already known on this subject?
In most developed countries (for example, the United States), there are currently higher rates of cardiovascular disease among individuals with lower levels of education. Costa Rica is a remarkable exception to this, with no differences in cardiovascular disease by level of education among individuals over the age of 60. It is unknown whether this socioeconomic equity in cardiovascular mortality results from universal equity in the distribution of risk factors for cardiovascular disease, or from a balance of different education associations with risk factors.
What does this study add?
This study shows that there is not a uniform lack of education associations with cardiovascular risk factors in Costa Rica, nor a uniform presence of education associations with cardiovascular risk factors in the United States. Instead, a balance of different education-risk factor associations are found that are consistent with the observed differences in the cardiovascular mortality and education associations found in each country. This demonstrates that social equity in cardiovascular mortality is achieved without uniform equity of risk factors.

Competing interests
There were no competing interests for any of the authors of this article.

Figure Legends

Figure 1

Figure 1. Distribution of cardiovascular disease biomarkers in Costa Rica (CRELES, dashed lines) and the United States (NHANES, solid lines), men and women, age > 60. Vertical solid line indicates median in the United States, dashed vertical line indicates the median value in Costa Rica.

Figure 2

Figure 2. Odds ratios of anthropometric and health behavioral cardiovascular disease risk factors by education in Costa Rica (CRELES) and the United States (NHANES), men and women, age > 60. Odds ratios are from logistic regression models comparing the middle and highest categories of education to the lowest category, controlling for age and age-squared. Bar widths are proportional to the relative size of the population in each category of education. Odds ratios statistically significant ($p<0.05$) are shaded (black if level is associated with lower risk of CHD, grey if level is associated with a higher risk of CVD).

Figure 3

Figure 3. Differences in levels of cardiovascular disease biomarkers by education in Costa Rica (CRELES) and the United States (NHANES), men and women, age > 60. Education differences plotted are beta estimates from regression models comparing the middle and highest categories of education to the lowest category, controlling for age and age-squared. Bar widths are proportional to the relative size of the population in each category of education. Odds ratios statistically significant ($p<0.05$) are shaded (black if level is associated with lower risk of CVD, grey if level is associated with a higher risk of CVD).

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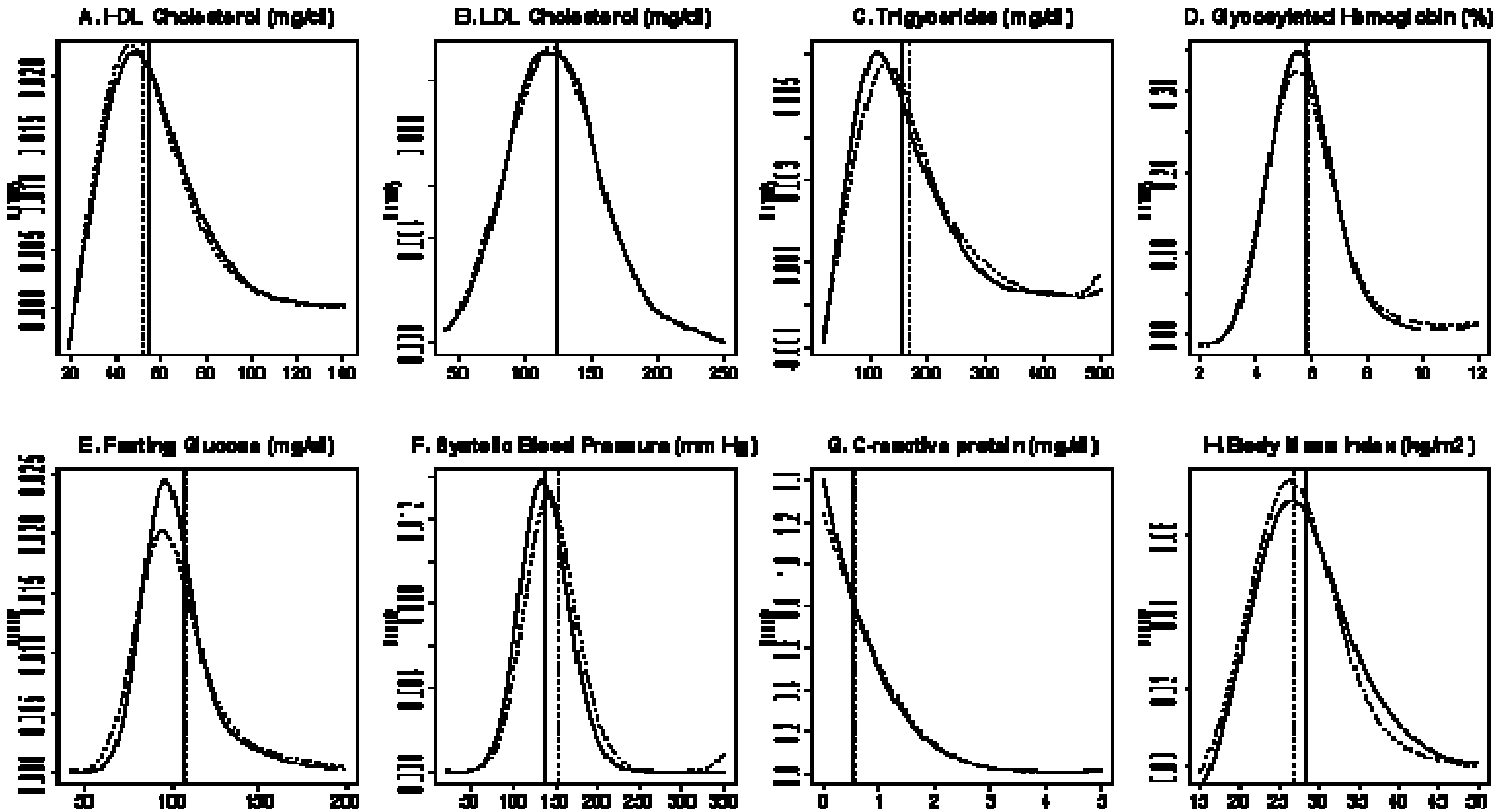
Supplementary data.

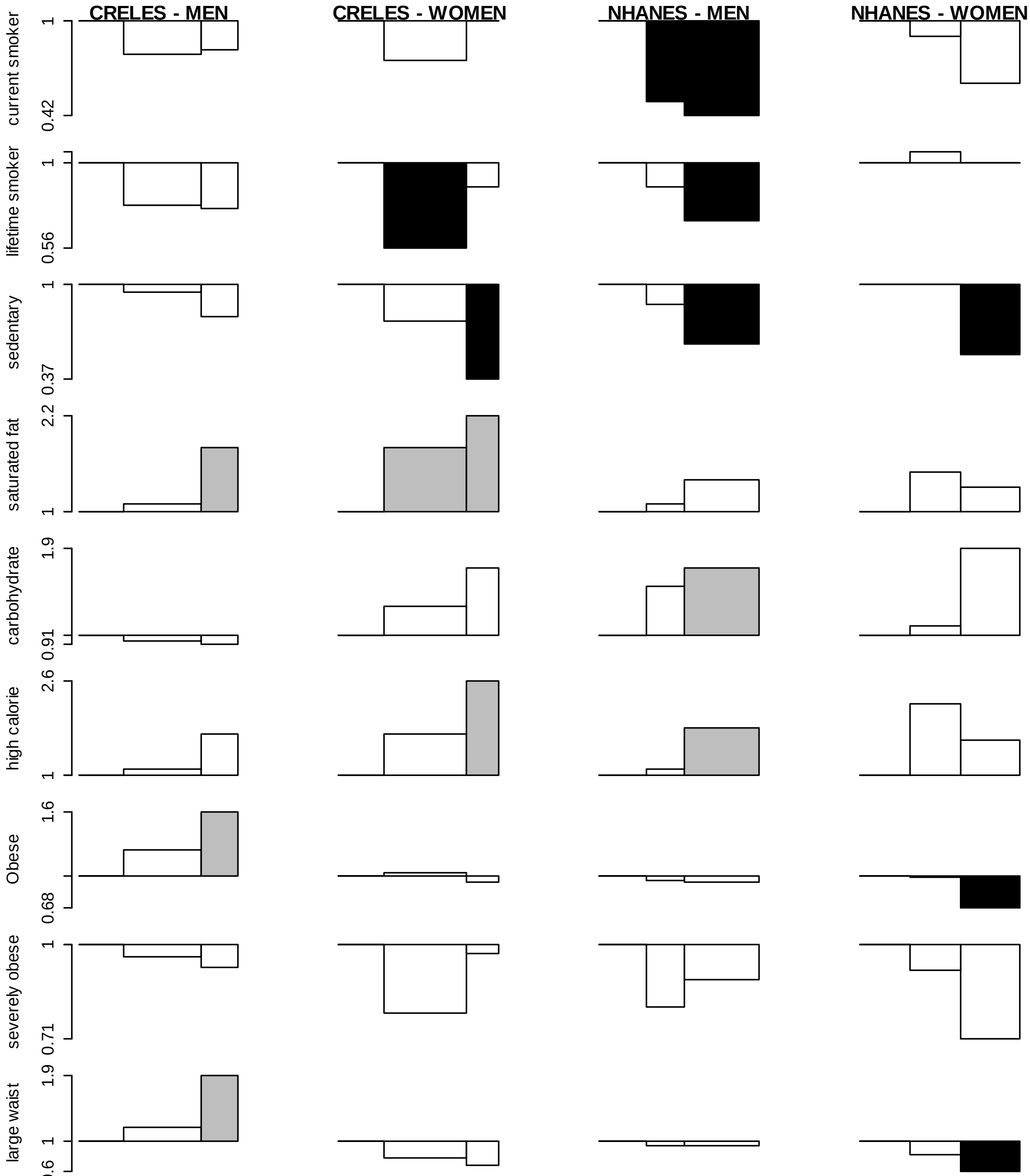
Table S1. Odds ratios of dichotomous anthropometric and health behavioral CVD risk factors by primary and alternative education categories in Costa Rica (CRELES), men and women, age > 60

		Costa Rica – primary education categories (0-2, 3-6, 7+ years)				Costa Rica – alternative education categories (0, 1-5, 6+ years)			
		men		women		men		women	
	level of education	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI	Odds Ratio	95% CI
Health behaviors									
current Smoker	2	0.79	(0.52,1.2)	0.76	(0.41,1.4)	0.71	(0.42,1.2)	0.34	(0.19,0.65)
	3	0.82	(0.49,1.4)	1.0	(0.41,2.5)	0.64	(0.37,1.1)	0.66	(0.34,1.3)
ever smoked	2	0.78	(0.59,1.03)	0.56	(0.44,0.72)	0.62	(0.43,0.90)	0.49	(0.34,0.71)
	3	0.76	(0.50,1.2)	0.87	(0.61,1.2)	0.49	(0.35,0.69)	0.60	(0.41,0.88)
not active	2	0.95	(0.72,1.3)	0.76	(0.54,1.1)	1.2	(0.81,1.7)	0.60	(0.36,0.99)
	3	0.79	(0.52,1.2)	0.37	(0.23,0.59)	0.96	(0.66,1.4)	0.33	(0.19,0.57)
Diet									
high saturated fat	2	1.1	(0.68,1.7)	1.8	(1.0,3.0)	1.6	(1.0,2.4)	2.9	(1.5,5.4)
(>40 g/day)	3	1.8	(1.1,3.1)	2.2	(1.2,4.3)	1.6	(1.0,2.5)	4.3	(2.3,8.0)
high carbohydrate	2	0.93	(0.61,1.4)	1.3	(0.80,2.3	1.4	(0.85,2.2)	1.6	(0.84,2.9)
(>400 g/day)	3	0.91	(0.57,1.5)	1.7	(0.95,3.0)	1.0	(0.57,1.9)	2.0	(1.1,3.6)
high calorie	2	1.1	(0.7,1.7)	1.7	(0.82,3.7)	1.4	(0.81,2.3)	2.0	(0.97,4.0)
(>3000 kcal/day)	3	1.7	(0.9,2.9)	2.6	(1.2,5.5)	1.6	(0.91,2.7)	3.0	(1.5,6.0)
Anthropometric									
Obese	2	1.2	(0.8,1.7)	1.0	(0.76,1.3)	0.87	(0.57,1.3)	0.72	(0.50,1.0)
(BMI>30)	3	1.6	(1.0,2.6)	0.94	(0.63,1.4)	1.4	(0.93,2.2)	0.90	(0.62,1.3)
severely obese	2	0.96	(0.60,1.53)	0.79	(0.52,1.2)	0.48	(0.25,0.94)	0.58	(0.36,0.94)
(BMI>40)	3	0.93	(0.46,1.9)	0.97	(0.56,1.7)	0.96	(0.52,1.8)	0.69	(0.38,1.2)
large waist	2	1.2	(0.85,1.6)	0.78	(0.61,0.98)	1.35	(0.92,2.0)	1.06	(0.69,1.63)
(>102 or 88 cm)	3	1.9	(1.2,3.1)	0.68	(0.48,0.96)	1.62	(1.1,2.4)	1.0	(0.62,1.62)

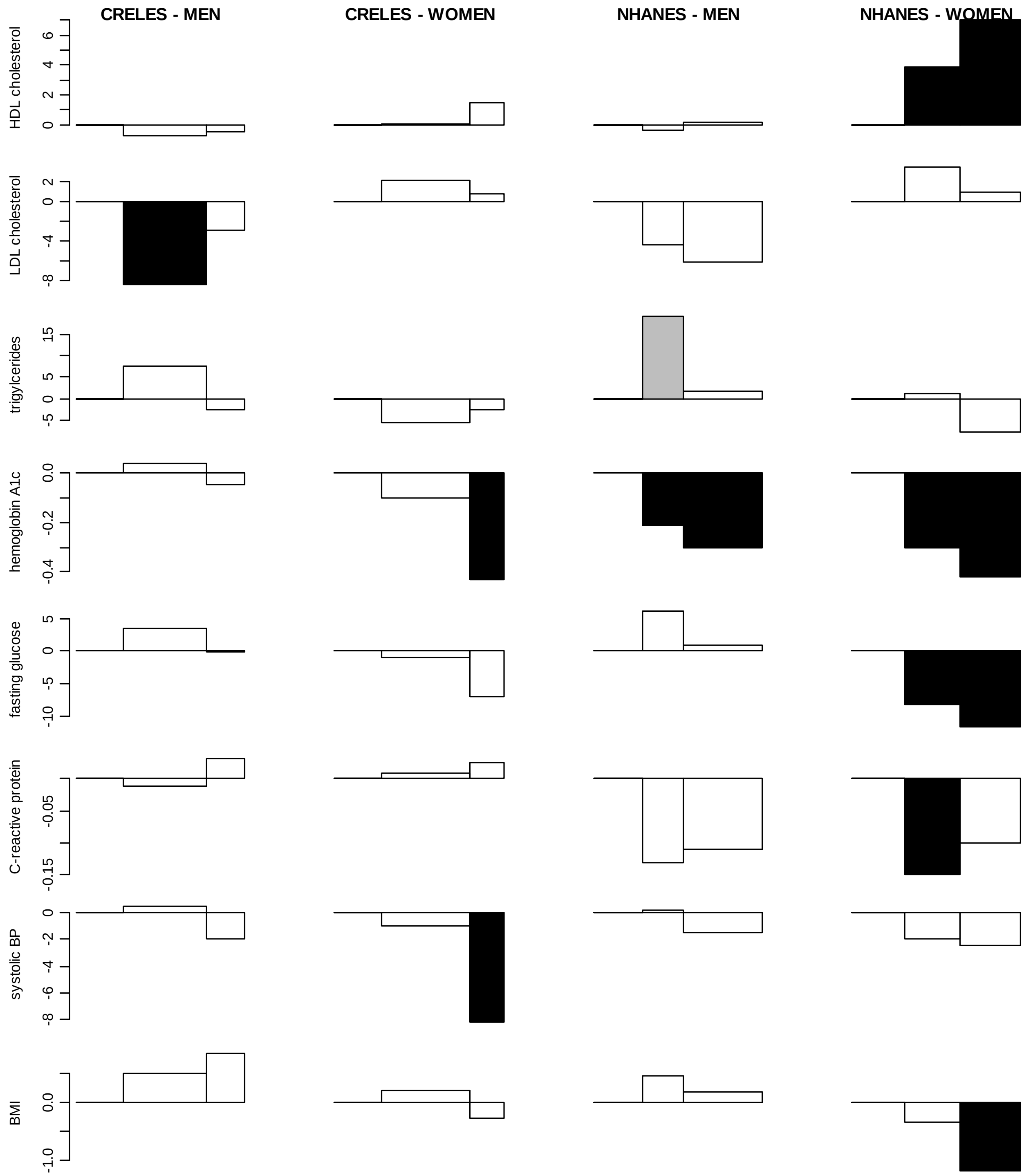
Table S2. Differences in levels of CVD biomarkers by primary and alternative education categories in Costa Rica (CRELES), men and women, age > 60

		Costa Rica – primary education categories (0-2, 3-6, 7+ years)				Costa Rica – alternative education categories (0, 1-5, 6+ years)			
	level of	men		women		men		women	
	education	Beta	95% CI	Beta	95% CI	Beta	95% CI	Beta	95% CI
HDL cholesterol	2	-0.76	(-2.5,1.0)	0.060	(-1.6,1.7)	-1.15	(-3.6,0.55)	-1.6	(-4.5,1.2)
(mg/dl)	3	-0.50	(-3.6,2.7)	1.5	(-1.3,4.4)	-0.33	(-2.8.,2.2)	0.96	(-1.7,3.6)
LDL cholesterol	2	-8.3	(-16,-1.1)	2.2	(-2.6,7.1)	-2.5	(-8.7,3.7)	13	(4.3,20)
(mg/dl)	3	-2.9	(-12,6.3)	0.86	(-7.2,9.0)	-4.8	(-12.,1.8)	5.2	(-1.9,12)
Triglycerides	2	7.5	(-8.2,23)	-5.4	(-17,6.0)	6.0	(-12,24)	0.59	(-18,19)
(mg/dl)	3	-2.6	(-27.3,22)	-2.4	(-23,18.4)	9.8	(-8.5,28)	-2.4	(-20,15)
Hemoglobin A1c	2	0.036	(-0.20,0.27)	-0.099	(-0.32,0.12)	0.035	(-0.12,0.19)	0.040	(-.21,0.30)
(%)	3	-0.046	(-0.35,0.26)	-0.43	(-0.74,-0.13)	0.064	(-0.10,0.23)	-0.27	(-0.56,0.024)
Fasting glucose	2	3.4	(-4.8,12)	-1.0	(-8.5,6.5)	8.0	(1.8,14)	7.7	(0.78,15)
(mg/dl)	3	-0.16	(-7.0,6.6)	-7.0	(-16,1.7)	8.3	(3.4,13)	1.6	(-6.1,9.2)
C-reactive protein	2	-0.012	(-0.068,0.043)	0.0093	(-0.037,0.056)	0.012	(-0.064,0.088)	-0.012	(-0.072,0.048)
(mg/dl)	3	0.031	(-0.045,0.11)	0.026	(-1.1,0.82)	0.032	(-0.050,0.11)	0.0044	(-0.063,0.072)
Systolic blood	2	0.44	(-2.6,3.5)	-1.0	(-3.9,1.9)	-0.92	(-2.7,0.85)	0.52	(-1.5,2.6)
Pressure (mm Hg)	3	-2.0	(-6.4,2.4)	-8.2	(-12,-3.8)	-1.3	(-3.3,0.74)	-1.7	(-3.6,0.26)
Body mass index	2	0.50	(-0.07,1.1)	0.20	(-0.70,1.1)	0.53	(-0.19,1.3)	0.054	(-0.77,0.88)
(kg/m2)	3	0.83	(-0.12,1.8)	-0.28	(-1.7,1.1)	1.0	(0.24,1.8)	0.25	(-0.62,1.1)


A. HDL Cholesterol (mg/dl)
B. LDL Cholesterol (mg/dl)
C. Triglycerides (mg/dl)
D. Glycosylated Hemoglobin (%)
E. Fasting Glucose (mg/dl)
F. Systolic Blood Pressure (mm Hg)
G. C-reactive protein (mg/dl)
H. Body Mass Index (kg/m2)



CRELES - MEN
CRELES - WOMEN
NHANES - MEN
NHANES - WOMEN
current smoker
1
0.42
lifetime smoker
1
0.56
sedentary
1
0.37
saturated fat
2.2
1
carbohydrate
1.9
0.91
high calorie
2.6
1
Obese
1.6
0.68
severely obese
1
0.71
large waist
1.9
1
0.6


CRELES - MEN
CRELES - WOMEN
NHANES - MEN
NHANES - WOMEN
HDL cholesterol
LDL cholesterol
trigylcerides
hemoglobin A1c
fasting glucose
C-reactive protein
systolic BP
BMI