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Abstract

Objectives: To examine education differentials in screening, awareness, treatment and control of hypercholesterolemia overall and in 3 race/ethnic groups.

Methods: We analyzed data for a nationally representative sample of 8,429 men and women ages 20 to 85 years, self-reported as white, black, Mexican American, or other race/ethnicity, who participated in the National Health and Nutrition Examination Survey from 1999–2002.

Results: Participants with < high school education were 2.5 times less likely than participants with ≥ high school education to have been screened for hypercholesterolemia, after adjusting for age and gender (odds ratio: 0.4, 95% confidence interval: 0.3–0.5, and similar across race/ethnic group). Multivariable models for awareness, treatment and control showed no significant trends associated with education after adjusting for age, gender, race and comorbidities.

Conclusions: Higher education significantly increased the odds of being screened for hypercholesterolemia overall and within each race/ethnic group. Education differentials were strongest for hypercholesterolemia screening, and weak or no longer apparent for subsequent steps of awareness, treatment and control. Focusing public health policy on increasing screening for individuals with low education might greatly improve their chances of preventing or mitigating morbidity related to hypercholesterolemia and subsequent cardiovascular disease.

Keywords: Cholesterol – Hypercholesterolemia – Education – Socioeconomic status – Race – Ethnicity.

Introduction

High cholesterol is an established risk factor for coronary heart disease (CHD). Proper detection and management of hypercholesterolemia is an important element in the prevention and mitigation of heart disease. While numerous studies have established associations between CHD and various indicators of low socioeconomic status (SES), education has proven to be the strongest SES measure associated with cardiovascular disease risk factors. One recent paper even suggested including education as a formal CHD risk factor in the National Cholesterol Education Program’s (NCEP) guidelines. Few studies, however have examined the pathway linking low education to CHD.

Poor detection and management of high cholesterol in people with low education may explain some of the association between education and CHD. Education can influence knowledge about disease risk factors and the health care system, as well as the ability to utilize it effectively, thus affecting the rate of screening for, and awareness of, hypercholesterolemia. This lack of knowledge and health care under-utilization might also influence treatment decisions and treatment compliance.

Accordingly, the objectives of this study were to examine associations between education and each of four sequential steps in the process of diagnosis and management of high cholesterol: screening, awareness, pharmaceutical treatment and control, in order to identify the education differentials at each stage. Furthermore, we examined the associations between education and these outcomes after adjusting for possible confounding factors.
Research suggests that race and SES interact in their effects on health. Many studies have been unable to examine the interaction between SES and race due to limited sample sizes for minority race/ethnic groups. Using NHANES data, a large, ethnically diverse nationally representative sample, we had the opportunity to investigate education differentials within race/ethnic groups. These associations were examined first in the entire sample, and then within race/ethnic groups.

**Methods**

The study population included men and women ages 20 and older who participated in the National Health and Nutrition Examination Survey (NHANES), conducted between 1999 and 2002.

**Selection Criteria**

Age was determined at the time of the NHANES interview. Of the initial 21,004 participants, we excluded those under the age of 20, and those with missing data for any of the following variables: total serum cholesterol level, education, self-report of high cholesterol, or use of cholesterol medication (if missing both medication bottle review and self-report). The total study sample size was 8,429.

**Outcome Definitions**

The four primary outcome measures related to the diagnosis and management of hypercholesterolemia were screening, awareness, lipid-lowering medication use, and adequate control. Due to skip patterns in NHANES, these outcomes were sequential in nature, since only those who were screened were asked about awareness, and only those aware were asked about treatment. Previously published studies likewise examined these outcomes sequentially.9–13