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Brief Original Report

Explaining racial and ethnic disparities in cholesterol screening

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ABSTRACT

Objective. To determine whether racial and ethnic disparities in cholesterol screening persist after controlling for socioeconomic status, access to care and language.

Methods. Data were obtained from the 2011 Behavioral Risk Factor Surveillance System for men aged 35 and older and women aged 45 and older in accordance with the United States Preventive Services Task Force guidelines. Self-reported cholesterol screening data are presented for 389,039 respondents reflecting over 141 million people. Sequential logistic regression models of the likelihood of never having been screened are presented adjusted for demographic characteristics, health status, behavioral risk factors, socioeconomic status, health care access, and questionnaire language.

Results. A total of 9.1% of respondents, reflecting almost 13 million individuals, reported never having been screened. After adjustment for socioeconomic status, health care access and Spanish language, disparities between whites and Blacks and Hispanics, but not Asians and Pacific Islanders, were eliminated.

Conclusions. Lower socioeconomic status, lack of healthcare access and language barriers explained most of the racial and ethnic disparities in cholesterol screening. Expanding insurance coverage, simplifying cardiac risk assessment and improving access to culturally and linguistically appropriate care hold the greatest promise for improving cardiovascular disease screening and treatment for vulnerable populations.

Despite minority populations having more risk factors for cardiovascular disease than whites, minority populations are less likely to report having been screened for hyperlipidemia than whites (Brown et al., 2001; Nelson et al., 2002; Pignone et al., 2001; Wong et al., 2002). The purpose of this study was to use recent, nationally representative data to determine the extent to which these disparities are explained by underlying demographic, health and behavioral risk factors, socioeconomic status and access to care or language factors (Dubay and Lebrun, 2012). The study analyzes the screening population defined by the US Preventive Services Task Force (USPSTF), men aged 35 and older and women aged 45 and older (Screening for lipid disorders in adults, 2012).

Methods

The 2011 Behavioral Risk Factor Surveillance System (BRFSS)

The BRFSS is conducted by telephone in multiple languages with oversight by the Centers for Disease Control and Prevention (About the BRFSS, 2012). The BRFSS uses iterative proportional fitting (raking), which accounts for unequal probability of selection, noncoverage, and nonresponse of individuals of different age groups, genders, race and ethnicity, education, marital status, geographic region, renter/owner status, and telephone source (landline or cell phone).

All 2011 respondents were asked, "Blood cholesterol is a fatty substance found in the blood. Have you EVER had your blood cholesterol checked?" Respondents answering yes were asked "About how long has it been since you last had your blood cholesterol checked?" While we present data on respondents who reported last having been screened 5 or more years previously, the analysis is focused on respondents who indicated that they had never been screened. The USPSTF guidelines suggest cholesterol screening for men aged 35 and older and women aged 45 and older who are at 'increased risk' for cardiovascular disease. Because the BRFSS lacks information on all risk factors to designate increased risk, all women aged 45 and older were included in the sample.

Screening risk factors

Age was dichotomized as 65 or older given Medicare eligibility and ease of interpretation; results were not sensitive to continuous age. Race and ethnicity were categorized uniquely as Hispanic, and if not, as white, black, Asian/Pacific Islander (API), American Indian/Alaska Natives (AIANs), other or multiracial, or missing (1.2%). Self-reported health was coded as fair/poor or excellent/very good/good and a history of diabetes, heart attack, angina, or stroke. Behavioral risk factors included smoking and body mass index (BMI). Missing (14.6%) household income was regression-imputed into five reported household income

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categories. Educational attainment was categorized as less than high school, high school, some college, or college degree. Employment status was categorized as employed, retired, or unemployed/unable to work/homemaker/student. Having health insurance (private or public) was used as a measure of access to care (Brooks et al., 2010). Respondents also reported whether they had one or more personal doctor. Spanish speaking respondents were categorized by whether the BRFSS was administered in Spanish.

Statistical analysis

All analyses present nationally representative weighted proportions. Multiple logistic regression was used to determine the age and sex adjusted association of race/ethnicity with the likelihood of never having been screened. Then respondent's health status, behavioral risk, socioeconomic status, access to care, and language measures were sequentially added to the model to estimate changes in the odds ratios for race and ethnicity. Stata complex survey software (version 12, College Station, TX) provides odds ratios equivalent to the relative risk.

Results

Differences by race and ethnicity

Table 1 presents the population-weighted proportions by screening status, reflecting over 141 million adults. A total of 9.1% of all respondents in the USPSTF screening population reported never having had their blood cholesterol level checked (approximately 12.9 million people) while 3.3% reported not having been screened in the preceding 5 years. As compared to 6.9% of whites, the no screening proportion was 13.0% for AIANs, 10.6% for blacks, 10.6% for APIs, and 20.7% for Hispanics.

Other screening differences

Men, younger respondents, smokers (17.5%) and those with missing/refused BMI (13.3%) were more likely to have never been screened. There was a large income and education gradient (4.0% of respondents with high income to 17.8% of those with low income, 4.2% of college graduates versus 19.2% of those who did not graduate high school had not been screened). Almost one-third of respondents without health insurance, a personal doctor or who spoke Spanish reported never having had their cholesterol checked.

Logistic regression results

Table 2 displays four successive logistic regression model results for the likelihood of having never been screened. In the first age and sex adjusted model, all minority racial and ethnic groups had significantly higher odds of having never been screened for cholesterol. As compared to whites, Hispanics were over three times more likely to report never having been screened while AIANs, APIs, blacks, and multi-racial individuals had forty to ninety percent greater odds of reporting never having been screened.

These race and ethnicity odds ratios were virtually unchanged in the second model after adding the significant effects of health status and behavioral risk factors. The third model, which included socioeconomic status and health care access, eliminated the significance of the disparity between blacks and whites. The disparity between Hispanics and whites only lost statistical significance in the final model after inclusion of Spanish language, while API remained 1.6 times more likely than whites to never have been screened. Household income, education, and employment were powerful factors, but independent of these, Spanish speakers, who included 45% of Hispanic respondents, were 43% more likely to never have been screened. Those lacking health insurance had twice the likelihood of never having been screened while those reporting no personal doctor were 3.6 times more likely to never have been screened.

Discussion

This study reveals that socioeconomic, health care access and language factors explain almost all of the racial and ethnic disparities in lack of cholesterol screening. These findings are consistent with some but not all previous literature (Brown et al., 2001; Nelson et al., 2002). Our results particularly endorse culturally and linguistically tailored messaging for AIAN and API populations whose results may reflect language barriers for some Asian Americans (Ye et al., 2012). However, these results imply that the greatest effect on racial screening disparities overall will come from interventions for younger, low income and uninsured individuals.

Consistent with previous research, we found that over 30% of those without health insurance and without a personal doctor reported never having had their cholesterol checked (Ayanian et al., 2000). Both lack of health insurance and lack of a 'personal doctor' are huge factors behind the very high proportion of Hispanics who report having never undergone cholesterol screening, despite the fact that Mexican Americans who have been screened are more likely to have high LDL cholesterol than whites and blacks (Go et al., 2013). Results for language clearly support increasing the number of bilingual health professionals (Eamranond et al., 2009; Jurkowski and Johnson, 2005).

The Affordable Care Act (ACA) will provide insurance to millions of the uninsured and ACA "essential health benefits" will cover preventive laboratory services like cholesterol screening. Implementation of the ACA should thus provide a large boost to cholesterol screening rates, at least in those states that opt for expanded Medicaid coverage. However, even after ACA implementation, between 20 and 30 million residents will still not have health insurance. For them, better coordination of charity care through local and regional access to care programs will be critical.

Case management and community health worker outreach programs also show great promise in reaching hard to reach low income populations (Liao et al., 2010; Ma et al., 2009). The American Heart Association's 2013 Scientific Statement and Community Guide summarizes a variety of exemplary community based programs that could have potentially large effects on racial and ethnic health disparities (Pearson et al., 2013). There are also promising alternatives to fasting cholesterol testing such as point of care finger stick technology (Parikh et al., 2009) and non-fasting direct measurement of LDL cholesterol. Some have advocated initiating treatment without requiring laboratory measures for patients with enough evidence of cardiovascular risk (Gaziano et al., 2008).

Limitations

The USPSTF guidelines suggest cholesterol screening for women aged 45 and older who are at 'increased risk' and some women in the sample may not have met this criteria. However, this study provides a much more conservative estimate of lack of screening than the guidelines from the National Institutes of Health National Cholesterol Education Program ATP III, which recommend cholesterol screening at five year intervals for all adults aged 20 or older (Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults, 2001).

A report from the 2005–2008 National Health and Nutrition Examination Survey (NHANES) found that 22.3% of the USPSTF Recommendation A population reported not having been screened within five years (62.4% of this population had abnormal results) (Gillespie et al., 2012). It is of interest that the NHANES estimate actually mirrors previous BRFSS estimates from the same years, indicating significant progress in improving cholesterol screening almost 10% through 2011 (Centers for Disease Control and Prevention, 2012).

Perhaps the most important limitation of the BRFSS is the lack of data on the drop off between screening and effective treatment. The