DISPARITIES IN THE PREVALENCE OF DIABETES: IS IT RACE/ETHNICITY OR SOCIOECONOMIC STATUS? RESULTS FROM THE BOSTON AREA COMMUNITY HEALTH (BACH) SURVEY

Objectives: Many researchers and clinicians continue to believe that non-modifiable race/ethnicity is a major contributor to diabetes, prompting a well-intentioned search for genetic and bio-physiological explanations. We seek to reinforce earlier findings showing that socioeconomic status is more strongly associated with diabetes prevalence than race/ethnicity and suggests a very different and potentially modifiable etiologic pathway.

Methods: A community-based epidemiologic survey of 5503 Boston residents aged 30–79 years (1767 Black, 1877 Hispanic, 1859 White; 2301 men and 3202 women).

Results: After adjusting for age and sex, Blacks and Hispanics have statistically significantly increased odds of having diabetes: Black (OR, 2.0; 95% CI, 1.4–2.9) and Hispanic (2.4; CI 1.6–3.4) compared to Whites. If socioeconomic status, a combination of education and income, is added to the model, these odds are reduced for both Blacks (OR 1.6; CI, 1.1–2.2) and Hispanics (OR 1.6; CI, 1.1–2.3). In a multivariate logistic regression adjusting for age, sex, socioeconomic status, obesity, hypertension, gestational diabetes, physical activity, trouble paying for basics, health insurance status, and family history of diabetes, these odds are reduced further: Black (OR 1.0; CI, 0.7–1.5) and Hispanic (OR 1.3; CI, 0.9–2.1) and are no longer statistically significant.

Conclusions: Consistent with other reports, we find socioeconomic status has a much stronger association with diabetes prevalence than race/ethnicity. Continuing to focus on race/ethnicity as a primary determinant of diabetes prevalence overemphasizes the importance of biomedical factors and diverts effort from socio-medical interventions such as improving social circumstances, access to effective care, and upstream redistributive social policies. (Ethn Dis. 2009;19:288–292)

Key Words: Diabetes, Race/Ethnicity, Socioeconomic Status

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Introduction

Federal agencies (eg, the National Institutes of Health and the Centers for Disease Control) and professional organizations (eg, the American Diabetes Association) continue to identify race/ethnicity as a major determinant of the prevalence of diabetes in the United States.¹⁻³ This has spawned a well-intentioned search for underlying genetic and bio-physiological explanations, eventually leading to identification of promising biomedical interventions to reduce race/ethnic disparities in diabetes. In contrast, social epidemiologists continue to find that socioeconomic status has a much stronger association with diabetes prevalence, even accounting for much of the widely accepted race/ethnic effect.⁴⁻¹⁰ Such findings suggest markedly different explanations (in social circumstances, and environmental and neighborhood influences) and precipitate different types of primary, secondary, and upstream policy interventions. In the United States and many other countries, race/ethnic minorities are more likely to be poorer and less well-educated than the majority White population. This has caused researchers to repeatedly ask the question which motivates this paper: is the widely accepted disparity in the prevalence of diabetes really attributable to race/ethnicity, which is considered non-modifiable, or is it due to socioeconomic status, which is potentially modifiable through upstream social policy interventions? This question has important implications for clinicians, health services researchers, and policy makers. We attempt to answer it using data from a community-based epidemiologic survey of Boston, Massachusetts residents.

Methods

The Boston Area Community Health (BACH) survey is an epidemiologic survey of Boston residents aged 30–79 years. Detailed methods have been described elsewhere.¹¹ In brief, a stratified two-stage cluster sample design was used to recruit residents of Boston with the goal of approximately equal number of participants by sex, race/ethnicity (Black, Hispanic, White), and age group (30–39, 40–49, 50–59, 60–79). In total, 5503 adults participated in BACH (1767 Black, 1877 Hispanic, 1859 White respondents; 2301 men and 3202 women). The response rate was 63.3% of screened eligible participants, which is typical of an epidemiologic field survey requiring a lengthy in-home protocol and phle-
RESULTS

The overall prevalence of diabetes was 9.5%. As expected, the prevalence of diabetes (and many of its associated risk factors) differed significantly by race/ethnicity (P<.0001) (Table 1). However, the prevalence of diabetes, and many of its associated risk factors, also varied by socioeconomic status (SES) within a race/ethnic categorization (Table 2), with the exception of family history of diabetes for Blacks and Hispanics. There was no significant association of the prevalence of diabetes by race/ethnicity within a socioeconomic level (P=.22 for lower SES, P=.72 for middle SES, P=.24 for upper SES).

In a logistic regression model, with the dependent variable diagnosed diabetes, after adjusting for sex and age, Blacks (OR 2.04, 95%CI, 1.42–2.94) and Hispanics (OR 2.35; CI, 1.60–3.44) had higher odds of diabetes compared to Whites (Figure 1). When socioeconomic status is added to the model these odds dropped for Blacks.
Table 2. Variation in the prevalence of diabetes and risk factors for diabetes by race/ethnicity and socioeconomic status ($P$ value is from chi-square test of whether the distribution is the same across socioeconomic status by race/ethnicity)

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Black</th>
<th>Hispanic</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lower</td>
<td>middle</td>
<td>upper</td>
</tr>
<tr>
<td>Sample size (N)</td>
<td>841</td>
<td>797</td>
<td>129</td>
</tr>
<tr>
<td>Diabetest (%)</td>
<td>18.2</td>
<td>9.4</td>
<td>6.9</td>
</tr>
<tr>
<td>High blood pressure (%)</td>
<td>42.4</td>
<td>33.1</td>
<td>26.7</td>
</tr>
<tr>
<td>Gestational diabetes* (%)</td>
<td>5.4</td>
<td>3.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Body mass index (%)</td>
<td>&lt;25 kg/m²</td>
<td>22.4</td>
<td>22.2</td>
</tr>
<tr>
<td>Physical activity (%)</td>
<td>low</td>
<td>38.4</td>
<td>17.2</td>
</tr>
<tr>
<td>Family history of diabetes (%)</td>
<td>49.3</td>
<td>46.2</td>
<td>47.8</td>
</tr>
<tr>
<td>Trouble paying for basics (%)</td>
<td>49.9</td>
<td>31.9</td>
<td>12.1</td>
</tr>
<tr>
<td>Health insurance status (%)</td>
<td>private</td>
<td>23.4</td>
<td>66.0</td>
</tr>
</tbody>
</table>

* Among women who have been pregnant.

Fig 1. Odds ratios for the prevalence of diabetes (with 95% CI) for three models: 1) age, sex, race/ethnicity; 2) age, sex, socioeconomic status (SES), race/ethnicity; and 3) age, sex, socioeconomic status, trouble paying for basics, health insurance status, hypertension, gestational diabetes, and family history of diabetes, race/ethnicity. The $P$ value for race/ethnicity is from a Wald F test with 2 degrees of freedom in the numerator.
DISCUSSION

We have shown that socioeconomic status, a potentially modifiable risk factor, is more important in determining who has diabetes than the non-modifiable risk factor of race/ethnicity. This result is consistent with other reports showing higher prevalence of diabetes in depressed areas, or in people of lower socioeconomic status.\(^4\text{-}^\text{10}\)

**CONCLUSIONS**

We have shown that socioeconomic status is more important than race/ethnic categorizations as an indicator of who has been told that they have diabetes. There is no suggestion that our findings are entirely novel, or differ from previous work. Our results are consistent with and reinforce findings from other important studies.\(^4\text{-}^\text{10}\) Given the consistency of these results, it is of concern that research and interventions developed by governments aspiring to reduce disparities in diabetes continue to focus disproportionately on race/ethnic categorizations, rather than the apparently more important socioeconomic status. We do not deny that there may be some genetic components in the prevalence of diabetes\(^19\text{-}^\text{20}\) (as family history is the second most 

with medical records.\(^16\text{-}^\text{18}\) Second, it should be noted that individual contributions to an \(R^2\) statistic are highly dependent upon the order in which variables are entered into the model. We felt that entering potentially modifiable risk factors first and entering variables in their order of importance was the most appropriate approach. Third, our study does not include a number of other minority groups (eg, Asian Americans). Unfortunately, the city of Boston does not have people of other race/ethnic groups in sufficient numbers to include them given our survey sampling design. Fourth, while a simple combination of education and income may not fully capture what is signified by the concept of SES, it does appear to account for much of the variation in the prevalence of diabetes. Fifth, this is a cross-sectional study and reported results are associations. However, as BACH is transitioning to a longitudinal study (follow-up is ongoing), we will be able to determine the incidence of newly diagnosed cases by race/ethnicity and SES.
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important non-modifiable variable), but our concern is that too much attention is being focused on race/ethnicity rather than on socioeconomic circumstances. Race/ethnicity cannot be changed, but socioeconomic circumstances are potentially amenable to change.

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REFERENCES

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Data analysis and interpretation: Link
Manuscript draft: Link, McKinlay
Statistical expertise: Link
Acquisition of funding: McKinlay

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