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Gender differences in the socioeconomic gradient in self-reported diabetes: Does health service access play a role?

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ABSTRACT

Aims: To investigate the hypothesis that gender difference in the socioeconomic gradient of self-reported diabetes might be partially determined by a detection bias: among low SEP men, but not women, a less frequent use of medical care would result in lower diabetes detection and awareness.

Methods: We conducted a cross-sectional analysis of 2387 (57.1% women) Brazilian university non-faculty civil servants. We quantified the association between educational attainment (a marker of socioeconomic position) and self-reported diabetes through gender-specific logistic regression models adjusting for age. Health insurance coverage (a marker of potential health care access) and never having had serum cholesterol tested (a marker of actual care access) were analyzed to investigate the role of detection bias.

Results: Compared to participants with college education or higher, the adjusted odds ratio (OR) and 95% confidence interval for diabetes for those with less than high school was 2.5 (1.0–6.5) in men and 5.0 (2.1–11.7) in women. Only among men we observed an increment in this OR after an additional adjustment for markers of care access [men 3.5 (1.3–9.1); women 4.9 (1.9–12.1)].

Conclusions: Our findings suggest that health service access may explain some of the gender difference in the socioeconomic gradient of self-reported diabetes.

1. Introduction

An inverse association between low socioeconomic position [SEP] and both prevalent [1–7] and incident [8,9] type 2 diabetes has been shown for women but not men [1,3,4,6–8]. The reasons for this putative effect modification by gender remain unclear, but it has been suggested [6] that it might be explained by gender differences in the association between SEP and several established risk factors for type 2 diabetes, such as obesity, physical inactivity, and unhealthy diet.

Many studies reporting gender differences in the inverse association between SEP and diabetes assessed diabetes status through questionnaires [4,8] or community diabetes registries [7], and thus only evaluated already diagnosed diabetes. Since low SEP is associated with a lower usage of health care [10–14] and so is male gender [12–16], we investigated an alternative hypothesis that such differences might result from a detection

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bias: among low SEP men, but not women, a less frequent use of medical care would result in lower diabetes detection and awareness.

The main objective of this study was to explore the role of health service access in explaining gender differences in the inverse association between socioeconomic position and self-reported history of physician-diagnosed diabetes.

2. Materials and methods

2.1. Study population

Our subjects were 3054 participants aged 30 or older in two stages of baseline data collection (1999–2001) of a cohort study (the Pró-Saúde Study) of non-faculty civil servants at a university in Rio de Janeiro, Brazil. The current analyses excluded pregnant women ($N = 22$), and those with missing data on diabetes status ($N = 96$), educational level ($N = 61$), or other covariates ($N = 478$). The study population comprised 2387 participants (1033 men and 1364 women). This study was approved by the University's Research Ethics Committee.

2.2. Measures

Except for current weight, height and waist circumference, data were collected through a multidimensional self-administered questionnaire. Diabetes status was assessed from the following questions: ''Has a doctor ever informed you that you had or have <diabetes> (yes/no)'' and ''What was your age at the time when the doctor told you for the first time that you had or have <diabetes>?''. For the present analysis we chose educational level (ranked as less than high school, high school and college or higher) as an indicator of SEP.

Health insurance coverage (a marker of potential health care access) and never had serum cholesterol tested (a marker of actual care access) were analyzed to examine the role of detection bias. Among the available data, having had serum cholesterol tested was chosen as a proxy for the possibility of having ever had blood glucose levels measured since it also represents a blood test. In our study population, the employees were not covered by a group health insurance provided by the university. Individuals have to buy their own coverage or obtained it under a spouse's or parent's plan.

Other covariates were: age, gender, leisure-time physical inactivity (LPTI) at age 20 (rarely or never exercising), body mass index (BMI) at age 20 (based on height at study entry and self-reported recall of weight at age 20), current BMI, and waist circumference. Current weight, height and waist circumference were measured according to standardized methods.

2.3. Data analysis

Descriptive analyses for all variables were stratified by gender and educational attainment. Differences by gender were determined by chi-square tests. Differences by educational attainment in each gender were determined by chi-square tests for trend. We calculated crude and age-adjusted prevalence of self-reported history of physician-diagnosed diabetes and the associated 95% confidence intervals (CI) stratified by educational level and gender.

We estimated the association between educational attainment and self-reported diabetes through gender-specific logistic regression models adjusting sequentially for: (1) age; (2) health insurance coverage and never having had serum cholesterol tested. In addition to comparing gender-specific estimates, we also fit a single logistic regression model with education–sex product term to formally test for statistical interaction. Analyses were performed using Stata 8.0/SE [17].

3. Results

Among the 2387 participants, 1364 (57.1%) were women. Professionals (which included professionals or other high-ranked employees such as doctors and managers) comprised 26% of the study population equally among males and females; routine non-manual workers (which had a large proportion of registered nurses and administrative clerical and information technology staff) and manual workers (janitors, cooks, security personnel, or other similar jobs) were, respectively, 58% and 71% of males, and 16% and 3% of female participants.

Characteristics of the study sample, stratified by gender and educational level, are listed in Table 1. An inverse relationship between educational attainment and all established risk factors for diabetes was observed among women ($p < 0.001$ for all variables), whereas among men the gradient was less pronounced (LPTI – current and at age 20 – $p = 0.05$ and 0.024, respectively) or absent (remaining risk factors). Women were more likely than man to have health insurance coverage (62.8% *vs* 51.5%; $p < 0.001$) and less likely to never having had a serum cholesterol tested (9.3% *vs* 17.3%; $p < 0.001$). Among the 856 insured women, 34.2% obtained coverage under a spouse's or parent's plan, whereas among the 532 insured men this proportion was 19.4% ($p < 0.001$). A direct association between educational attainment and health insurance coverage was observed for both men and women ($p < 0.001$), whereas for never having had a serum cholesterol tested an inverse association was observed only among men ($p < 0.001$).

There were 44 cases of self-reported history of physician-diagnosed diabetes among 1033 men and 56 among 1473 women. For both men and women the median age at the time diabetes was diagnosed was 42 years (interquartile range: 37–47) of age. The overall age-adjusted prevalence did not differ substantially between men (3.3%, 95% CI 2.3–4.5) and women (2.6%, 95% CI 1.9–3.6).

Table 2 shows an inverse and graded association between educational attainment and self-reported diabetes in both genders, being stronger among women. In a model combining males and females, however, the product term between sex and educational level was not statistically significant (p for interaction = 0.55 and 0.44, respectively, for high school and college education or higher).

Compared to participants with college education or higher, the age-adjusted odds ratio (OR) for self-reported diabetes for those with less than high school was 2.5 (95% CI 1.0–6.4) among men; among women, the OR was 5.0 (95% CI 2.0–11.7) (Table 3, model 1). Only among men we did observe an increment in