KNOWLEDGE OF HEART DISEASE RISK AMONG SPANISH SPEAKERS WITH DIABETES: THE ROLE OF INTERPRETERS IN THE MEDICAL ENCOUNTER

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Objective: To investigate heart disease risk knowledge among Spanish speakers with diabetes.

Design: Single sample cross-sectional design.

Setting: A Spanish-language diabetes health fair in an inner-city community center in Connecticut.

Participants: Ninety-four Spanish-speaking adults participated. They were predominantly from Puerto Rico, had less than high school education, and were economically disadvantaged. Most had type 2 diabetes (96%) for an average of 10 years. Most had health insurance and a primary care provider. A sizable minority relied on ad hoc interpreters (friends or family members) during clinic visits, but most would prefer to use a professional medical interpreter.

Measures and Results: Knowledge of risk for heart disease was measured by a Spanish version of the Heart Disease Fact Questionnaire (HDFQ). Knowledge of heart disease was low (mean score 17.5 [out of 25], SD=5.0), and lack of knowledge was found for the risks of diabetes, high-fat foods, cholesterol, physical activity, hypertension, family history of heart disease, sex, and whether one is necessarily cognizant of having heart disease. Regression analyses showed that bank account status and use of ad hoc interpreters contributed significantly to the prediction of HDFQ scores. Having a bank account and not using family or friends as interpreters in visits with the primary care provider predicted higher HDFQ scores.

Conclusion: Heart disease risk knowledge was low in Spanish speakers with diabetes. Providing professional medical interpretation instead of relying on ad hoc interpreters is recommended for this high-risk group. (*Ethn Dis*. 2005;15:679–684)

Key Words: Diabetes, Heart Disease, Interpreter, Knowledge, Latino, Spanish

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INTRODUCTION

The prevalence of type 2 diabetes mellitus is 1.5 times higher in Latinos than in non-Latino Whites, affecting 2 million or 8.2% of all Latinos aged 20 years or older in the United States. Much of the US data available regarding diabetes in Latinos reflects Mexican Americans, and information on Puerto Ricans is lacking. However, it is known that Puerto Ricans are 1.8 times more likely to have diabetes than non-Latino Whites, and 26% of Puerto Ricans between the ages of 45–74 have diabetes.[1]

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Despite the risk for coronary heart disease (CHD) conveyed by diabetes, knowledge of CHD risk factors, and strategies to modify them, is low both among people with diabetes[2–5] and among those who speak English as a second language.[6] Some data show that older Spanish-speaking Latinos show especially poor health behaviors,[7] therefore special attention should be given to older Latinos with diabetes.[8]

Behavior, culture, and language proficiency play roles in risk for CHD among Latinos.[7,9] In general, people with limited English receive lower quality health care.[10–12] Looking at Spanish speakers specifically, the Hispanic Health and Nutrition Examination Survey found an association between primary language spoken and medical services in Mexican-American patients.[13]

Our research team has been investigating heart disease risk knowledge among people with diabetes. We found that English-speaking Latinos knew less than both Blacks and Whites regarding their risk for heart disease.[14] To date, knowledge of risk for heart disease among Spanish speakers with diabetes has not been investigated. The present study assessed knowledge of heart disease risk among predominantly Puerto Rican, Spanish-speaking community dwellers with diabetes in Connecticut. The Heart Disease Fact Questionnaire was carefully translated into Spanish and administered by native Spanish speakers. We investigated the roles of socioeconomic status, cultural variables, and healthcare system variables, with particular attention to use of medical interpreters, in patients' heart disease risk knowledge.

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METHODS

Sample and Procedure

The sample consisted of adults with diabetes attending a Spanish-language diabetes health fair in Connecticut. The

health fair targeted Spanish speakers and was advertised in Spanish-language newspapers and radio stations. It was sponsored by a community-based Hispanic health organization and was held at an inner-city community center that is accessible by public transportation. Admission to the health fair was free, but required preregistration. The health fair included nonprofit exhibitor booths, oral presentations, and health screenings, and both lunch and childcare were provided. The investigator had a booth at the fair and asked attendees if they were interested in completing an anonymous questionnaire as part of a research project. They were paid $5 for participation, and Spanish-language educational materials were freely distributed to all attendees. Most attendees who expressed an interest in the study agreed to participate (<5% of those approached declined participation). Fluently bilingual research staff were available to verbally administer the questionnaire to those who requested it. This study was approved by the University of Connecticut institutional review board; because the questionnaires were both innocuous and anonymous, the board did not require informed consent.

Measures

Demographic, socioeconomic status (SES), and language information was obtained by self-report questionnaire. Several factors were considered in assessing SES, including education, income, number of people supported by that income, home ownership, whether or not the participant had a bank account (checking or savings), and whether or not the participant reported difficulty in paying bills. A medical history questionnaire asked respondents whether or not a physician had diagnosed them with a variety of cardiac and diabetes-related conditions, such as hypertension, high cholesterol, and diabetes-related kidney disease. Response options were "yes," "no," and "I don't know." Body mass index (BMI) was calculated from self-reported height and weight.

A test of knowledge of heart disease risk was administered. The Heart Disease Facts Questionnaire (HDFQ) is a 25-item measure of heart disease knowledge.[5,15] It measures knowledge of risk factors, the link between diabetes and heart disease, and how to decrease risk for heart disease. Approximately half of the items specifically ask about diabetes-related risk for heart disease. Items include statements such as "Smoking is a risk factor for heart disease" and "A person who has diabetes can reduce their risk of developing heart disease if they keep their blood pressure under control." Respondents are asked to answer statements about risk for heart disease with "true," "false," or "I don't know." Scores are calculated by summing total number of correct answers; higher scores indicate more knowledge. The scale shows 8th grade readability, and respondents indicate that it imposes little burden.[5] The scale has shown good psychometric properties; test-retest reliability (r=.89),[15] internal consistency (Kuder-Richardson r=.77), satisfactory item P value and discrimination index calculations, and excellent discriminant validity.[5] Any question that <70% of the sample answered correctly was deemed a knowledge deficit.

The HDFQ was translated into Spanish per the guidelines of Bradley.[16] The translator was a native Spanish speaker from Colombia with a bachelor's degree in translation. She was familiar with the purpose of the questionnaire and the intention underlying the design of each item. Her translation was then reviewed for correctness by a doctoral-level native Spanish speaker. The questionnaire was then back-translated by a bilingual registered nurse from Puerto Rico. She had not seen the questionnaire in English. The study's principal investigator (JW) compared the back-translation to the original in order to identify any linguistic inaccuracies. Few inaccuracies were noted, and all were satisfactorily resolved with input from the principal investigator, the translator, and the back-translator. Research staff who are native Spanish speakers reviewed the final version. They confirmed that the terminology chosen was appropriate, and that it read as if it had originally been written in Spanish. The HDFQ instructions, as well as the medical history questionnaire and the demographics questionnaire, all underwent an identical translation process.

Analyses

Relationships among continuous variables were tested with Pearson r, between categorical variables with chi-square, and between categorical and continuous variables with analysis of variance (ANOVA). We also performed a linear regression analysis to predict HDFQ scores from variables that were significantly related to HDFQ scores in the correlational, chi square, and group difference analyses. Statistical analysis was performed with SPSS version 11.5 (SPSS Inc., Chicago, Ill).

RESULTS

Participants

Ninety-four people participated, most of whom were female, middle-aged, from Puerto Rico, spoke Spanish at home, and had been in the United States for an average of 23 years. See Table 1 for demographic descriptive statistics. Most had type 2 diabetes for an average of 10 years, which was treated with oral agents. Most reported heart disease risks including hypercholesterolemia and hypertension. See Table 2 for health-related descriptive statistics.

Educational attainment was positively skewed; 66% had less than a high school education. Approximately one fourth of the participants requested that the questionnaire be read to them, which suggests either poor vision or

Table 1. Descriptive demographic statistics

	Mean (SD) or % Yes
Place of Birth	
Puerto Rico	73.4%
Mexico	9.6%
Colombia	6.4%
Dominican Republic	3.2%
Peru	3.2%
United States	2.1%
Cuba	1.1%
Panama	1.1%
Prefer Spanish	
Speaking	91.6%
Reading	82.1%
Writing	86.3%
Speak Spanish	
At home	87.4%
At work (for those who work)	57.4%
Education	
Less than high school	66.0%
High school grad or equivalent	17.0%
Technical training or part college	9.6%
College graduate	7.4%
Annual income	
$10,000–$20,000	62.5%
$20,001–$40,000	17.5%
$40,001–$60,000	15.0%
$60,001–$80,000	5.0%
Difficulty paying bills	57.4%

low literacy in this sample. Thirty-six percent worked outside the home, and average annual income was also positively skewed; most reported a pre-tax income of $10,000 to $20,000, supporting two household members. Eighty percent reported some sort of healthcare coverage (Medicaid, Medicare, health management organization, etc); however, 35% said that they had experienced a time without coverage, for an average of 49 months. Three fourths reported currently having a primary care provider (PCP).

During PCP visits, 64% did not have a professional interpreter present but would prefer to have one. Chi-square showed that, relative to those who did not desire an interpreter, those who did were less likely to have a bank account ($\chi^2(1)=13.99$, $P<.01$) and less likely to be a high school graduate ($\chi^2(1)=5.79$, $P<.05$). Nearly half had a family member or friend interpret the PCP visit. Chi-square showed that, relative to those who relied on friends and family for interpretations, those who did not were more likely to have a bank account ($\chi^2(1)=4.93$, $P<.05$) but were equally likely to be high school graduates. See Table 2 for interpreter descriptive statistics.

Table 2. Descriptive health statistics

	Mean (SD) or % Yes
Age (in years)	59.2 (11.9)
Gender, %	
Female	65.5%
Type of diabetes, %	
Type 2	95.8%
Diabetes treatment, %	
Diet only	19.1%
Oral agents	54.3%
Insulin injections only	16.0%
Oral agents and insulin injections	10.6%
Age at diabetes diagnosis (in years)	49.1 (14.2)
Duration of diabetes (in years)	10.2 (9.6)
BMI	30.3 (5.2)
Current smoker, %	6.3%
Ever smoker, %	46.7%
Hypercholesterolemia	55.3%
Hypertension	58.5%
Have a primary care provider?	76.8%
Family or friend interpret?	47.4%
Prefer a medical interpreter?	64.2%

Knowledge of Heart Disease Risk

The Spanish version of the HDFQ used for the first time in this study performed very well; Kuder-Richardson-20 was .86. Knowledge of heart disease was low (mean score 17.5, standard deviation [SD]=5.0, range 0–24) compared to previously published samples (mean 20.4, SD=3.0, range 2–25).[5] This difference indicates that this sample had an average of three fewer correct items compared to an ethnically mixed, English-speaking community sample (72% White; 16% African American; 5% Latino; 2% Asian; 5% other).[5] Item analysis revealed knowledge deficits (items that <70% of respondents answered correctly) relating to risk of diabetes, high-fat foods, cholesterol, physical activity, hypertension, family history of CHD, sex, and whether one is necessarily cognizant of having heart disease.

Correlates of Knowledge of Heart Disease Risk

The HDFQ scores were not related to age, sex, or presence of cardiac or diabetes complications. These scores did not differ by diabetes type, diabetes regimen, or duration of diabetes.

Looking at SES variables, no differences in HDFQ scores were seen by income, home ownership, or insurance status. However, those who were not high school graduates or equivalent (eg, general equivalency diploma) had lower HDFQ scores (mean 17.0, SD=5.0) than those who were high school graduates (mean 20.1, SD=3.7), $F(1,93)=5.1$, $P<.05$. Those without a bank account had significantly lower HDFQ scores (mean 16.1, SD=5.7) than those with a bank account (mean 19.5, SD=3.0), $F(1,91)=11.30$, $P<.01$.

Looking at cultural variables, no differences were seen in HDFQ scores by place of birth, length of time in United States, self-reported English proficiency, language preference, language spoken at home, or language spoken at work.

Looking at healthcare system variables, no differences in HDFQ scores were seen by having a PCP, language spoken by PCP, or the presence of an interpreter for either. However, those who desired but did not have an interpreter for their PCP visits had significantly lower HDFQ scores (mean 16.6, SD=5.3) than those who did not desire an interpreter (mean 20.1, SD=2.6), $F(1, 78)=7.58$, $P<.01$.

Those who used family or friends to interpret during their PCP visits had lower scores (mean 15.7, SD=5.5) than those who did not use family or friends (mean 18.8, SD=4.1), F(1, 82)=8.23, $P<.01$.

In order to assess the variance accounted for by each variable that was significantly related to HDFQ scores, multiple regression was performed with HDFQ scores as the dependent variable, and education, bank account status, desire for a PCP interpreter, and use of family or friend as a PCP interpreter as the independent variables. *R* for regression was significantly different from zero, F(4,76)=4.71, $P<.01$. Two of the independent variables contributed significantly to the prediction of HDFQ scores (bank account $\beta=.25$, family or friend interpreter $\beta=-.27$). Altogether 21% of the variability in HDFQ scores (16% adjusted) was predicted by knowing the scores on these two independent variables (see Table 3). Having a bank account and not using family or friends as interpreters in visits with the PCP predicted higher HDFQ scores.

DISCUSSION

The purpose of this study was to investigate heart disease risk knowledge in Spanish speakers with diabetes. Knowledge in this sample was lower than in previously published English-speaking samples.[5] Coronary heart disease (CHD) risk knowledge was related to SES and medical interpretation. Specifically, having a bank account and not relying on family or friends as interpreters during PCP visits were both predictive of higher knowledge.

Knowledge [of heart disease risk] in this sample [of Latinos with diabetes] was lower than in previously published English-speaking samples.[5]

Coronary heart disease (CHD) risk knowledge was related to SES. Among the numerous financial questions we asked, only bank account status was predictive of knowledge. A bank account may be a particularly important indicator of financial resources in a sample with overall low income.[17–19] Moreover, basic reading, writing, and math skills are necessary to manage a bank account, and thus those who have accounts may have higher literacy. Valid government identification is necessary to open a bank account, and thus those with accounts may be more likely to be legal US residents and as a result may have better access to health care. (This would not apply to Puerto Rican respondents who are US citizens). We did not measure literacy or immigration status explicitly, and we could not verify financial self-reports.

Coronary heart disease (CHD) risk knowledge was also related to medical interpretation. Wanting but not using a professional interpreter was related to lower knowledge, although this effect was largely accounted for by the use of ad hoc interpreters. Those who used ad hoc interpreters, instead of professional medical interpreters, knew less about risk for heart disease and how to prevent it. Ad hoc interpreters are other patients, family members, friends, untrained non-clinical employees, and non-fluent healthcare professionals. Patient participation in medical encounters is important in diabetes care because of the chronicity of the disease and complexity of its treatment.[20,21] Moreover, diabetes treatment must be tailored to patient needs[22] and be culturally appropriate.[23] These optimal conditions require fluent communication between patient and provider.

Our findings complement existing data that show that the use of ad hoc interpreters is associated with more errors in medical interpretation,[24–26] decreased patient satisfaction,[27,28] decreased provider satisfaction,[28] and longer visit times.[29] In fact, persons with limited English cite language problems as the greatest barrier to care even above lack of health insurance or transportation difficulties.[6,30] Obstacles to the use of professional interpreters include US federal policy which specifically allows for use of ad hoc interpreters,[31] healthcare delivery systems that can make the provision of professional interpreters difficult, healthcare provider preference, [32–34] and patient uncertainty about requesting a professional interpreter. Interventions in these domains are warranted given the demonstrated benefits of professional medical interpreters. Patients with professional interpreters are more likely to keep appointments, have prescriptions written and filled, and to have preventive screenings. Implementation of professional interpreter services has also been shown to reduce ethnic disparities in care.[35]

Table 3. Predictors of HDFQ scores

	B	Beta	*t*	*P*
Education	0.90	0.06	0.56	.58
Bank account	2.46	0.25	2.06	.04
Desire interpreter	−0.22	−0.02	−0.14	.89
Ad hoc interpreter	−2.71	−0.27	−2.13	.04

$R=.45$, $R^2=.20$, adjusted $R^2=.15$.

LIMITATIONS

The study sample was small, thus some nonsignificant results may be due

to low statistical power. Recruitment for this study was at a diabetes health fair which may limit its generalizability. Health fair attendees actively seek health information and may therefore be better informed than their counterparts who did not attend. In addition, we did not assess literacy, specifically health literacy, in this study. Although several participants asked that the survey be read to them, this may have been due to literacy issues or some other reason, such as poor vision. Spanish-language proficiency of healthcare providers was not assessed. Therefore, we do not know whether participants who desire an interpreter speak English less proficiently, or whether they have a provider who speaks only rudimentary Spanish.

CONCLUSIONS

Spanish speakers with diabetes in the United States may be at a disadvantage for modifying their elevated risk for heart disease because they are not knowledgeable about their risk and how to modify it. This poor knowledge is related to lack of professional medical interpreters who are often not used despite a perceived need by patients. Changes in policy and healthcare provider practice are needed to increase the use of trained medical interpreters.

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