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Fukuoka, Yoshimi
Oh, Yoo Jung

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Perceived risk of heart attack and type 2 diabetes in Hispanic Adults with overweight and obesity

Yoshimi Fukuoka, PhD, RN, FAAN[*],
Department of Physiological Nursing, UCSF, San Francisco, United States

Yoo Jung Oh, MA
Department of Communication, University of California Davis, Davis, United States.

Abstract

Background: Individuals with a greater perceived risk of heart attack or type 2 diabetes tend to adopt recommended lifestyle changes to minimize their risks. Despite the rapidly growing Hispanic population in the United States, data regarding their perceived risks are lacking.

Objective: This study aimed to examine the perceived risk of suffering a heart attack and/or developing type 2 diabetes and explore the factors associated with these risk perceptions in Hispanic adults with overweight/obesity.

Methods: We analyzed 69 Hispanic adults with overweight/obesity who participated in the screening/baseline visit for the Adelgaza study, a weight loss and diabetes prevention trial, using descriptive statistics and logistic regressions. Heart attack or type 2 diabetes risk perception was assessed using a single-item questionnaire.

Results: The mean values (standard deviation [SD]) for age and body mass index (BMI) were 43.8 ($\pm$ 11.2) years and 31.7 ($\pm$ 4.5) kg/m^2, respectively. Of all participants, 46.4% perceived a low risk for heart attack and 29.0% perceived a low risk for developing type 2 diabetes in their lifetime, while only 11.6% reported both risk perceptions. Older age, lower BMI, and longer walking duration (min) per day were significantly associated with a lower perceived risk of heart attack ($P < 0.05$). Having no family history of heart attack, lower BMI, and lower fat intake were significant predictors of a lower diabetes-risk perception ($P < 0.05$).

Conclusions: Hispanic adults with overweight/obesity appear to underestimate their risks of heart attack and type 2 diabetes.

Keywords

Myocardial infarction; cardiovascular diseases; risk; perception; diabetes mellitus type 2; Hispanic Americans

[*]Corresponding author: Yoshimi Fukuoka, PhD, RN, FAAN, Professor, Department of Physiological Nursing, University of California San Francisco, San Francisco, United States, 2 Koret Way, N631, San Francisco CA 94143, Yoshimi.fukuoka@ucsf.edu.

Introduction

Cardiovascular disease (CVD) is the leading cause of death among Hispanic adults.[1, 2] However, the overall prevalence and mortality rates of CVD in Hispanics are lower than those in non-Hispanic whites in the United States (U.S.), although Hispanic adults have greater CVD risks than their counterparts. Oftentimes, this is described as the "Hispanic Paradox" in the literature.[3, 4] Given these unique challenges, the American Heart Association issued a scientific statement highlighting the public health burden imposed by CVD among Hispanics and advocating for the development of culturally tailored interventions for its prevention and treatment.[5]

Type 2 diabetes is a rapidly growing CVD risk factor in the general population and especially among Hispanic Americans. Hispanic adults are 1.7 times more likely to develop diabetes in the U.S. than non-Hispanic whites.[6] More importantly, more than 50% of Hispanic adults living in the U.S. are expected to develop type 2 diabetes in their lifetime. A key contributing factor is obesity, which is a modifiable risk factor for the development of both type 2 diabetes and CVD. The prevalence of overweight and obesity in Hispanic adults in the U.S. reached 80.4% in 2016.[7] Thus, obesity and type 2 diabetes significantly affect Hispanic adults' cardiovascular health.

Furthermore, Hispanic patients are less likely to receive preventive care and more likely to be diagnosed with CVD and type 2 diabetes in the later stages of these conditions as compared to non-Hispanic whites in the U.S.[8] These health disparities could be explained by a lack of health insurance coverage and barriers to primary healthcare access among Hispanic adults. For example, the Hispanic Community Health Study/Study of Latinos (HCHS/SOL) is a cohort study involving 16,415 Latino adults, among whom 52% with diabetes were uninsured, and only 59% were even aware that they had diabetes.[9] Therefore, increasing awareness of CVD and type 2 diabetes risks and early access to healthcare remain important public health concerns among Hispanic adults.

Hispanics constituted 18.5% of the U.S. population in 2019[10] and are anticipated to constitute 30% of the total U.S. population by 2050.[11] Hispanics are a diverse ethnic population, with different national origins, acculturation and immigration status, and other socioeconomic characteristics.[5] Despite the rapidly growing diversity in Hispanic populations in the U.S., comprehensive CVD data and tailored CVD and diabetes prevention programs targeted at this group are still lacking. Perceived risk, a fundamental component of behavior change,[12] refers to a subjective assessment of the risk of developing a health problem, such as a heart attack and type 2 diabetes. Individuals with a perceived high risk of heart attack and/or type 2 diabetes tend to adopt recommended lifestyle changes to minimize their risks. However, one's perceived risk is complex and acts in two fundamental ways (cognitive and emotional appraisals).[13] In addition, risk perception is influenced by personal experience and contextual factors.[14] Thus, it cannot be explained solely by one's rational thinking or knowledge. Therefore, this study aimed to examine the perceived risks of suffering a heart attack and/or developing type 2 diabetes and explore the factors that are significantly associated with these perceptions among Hispanic adults with overweight/ obesity.

Methods

Study design and sample

In this cross-sectional study, 69 Hispanic adults who participated in the screening/baseline visit for the Adelgaza study were analyzed. This study was a single-group pre- and post-weight loss and diabetes prevention trial. The study was approved by the University of California San Francisco Committee on Human Research prior to participant enrollment, and all participants provided written informed consent. Detailed descriptions of the study design and participant eligibility have been previously published.[15, 16] In brief, participants were recruited through mailings to census-defined American Latino households and flyers posted in hospitals, local businesses, and community centers in San Francisco, California. Eligibility criteria were as follows: body mass index (BMI) 25 kg/m^2; age 18 years; self-identified as Hispanic; ability to speak English, Spanish, or both; ownership of a smartphone and willingness to use an app every day and wear a Fitbit Zip (3-axis accelerometer); no diagnosis of type 1 diabetes, type 2 diabetes with insulin therapy, untreated type 2 diabetes, or other medical condition necessitating special attention in an exercise and/or diet program; and no ongoing participation in a lifestyle modification program. Eligibility was assessed by telephone, and the potential participants who met all eligibility criteria were invited for an in-person screening/baseline visit.

Measures and procedures

(i)   Heart attack and type 2 diabetes risk perceptions—To assess the perceived comparative risk of heart attack, participants were asked: "*Compared to other people of the same age and sex, how likely do you think it is that you could have a heart attack in your lifetime? (select one number)*"[17–20] Participants were able to rate the likelihood of having a heart attack in their lifetime by selecting a number from one to five: 1 = much less likely, 3 = the same risk, and 5 = much more likely. Scores were dichotomized into lower risk (scores 1–2) or same risk/higher risk (scores 3–5) of a heart attack.

Diabetes comparative risk perception was assessed by asking a single question: "*Compared to other people of the same age and sex, how likely do you think it is that you could develop type 2 diabetes in your lifetime? (select one number).*" If participants had already been diagnosed with type 2 diabetes and treated with oral medications, they were asked to select "not applicable." The remaining participants were asked to rate the likelihood of having type 2 diabetes in their lifetime by selecting a number from one to five: 1 = much less likely, 3 = the same risk, and 5 = much more likely. Scores were also dichotomized into lower risk (scores 1–2) or same risk/higher risk (scores 3–5) of type 2 diabetes. Using a single-item question to assess both heart attack and diabetes risk perceptions was considered valid based on a previous research.[21]

(ii)   Other measures—Data on sociodemographic factors, such as sex, age, marital status, U.S. or non-U.S. nativity, smoking status, and the Short Acculturation Scale for Hispanics[22], were collected from participants at the screening/baseline visit. The Short Acculturation Scale for Hispanics[22] was used to assess the level of acculturation at the screening/baseline visit. This scale comprises three subscales with 12 items on a scale of one

to five, with 1 representing "*Only Spanish or All Latinos/ Hispanics*" and 5 indicating "*Only English or All Americans.*" The language subscale includes 5 items (e.g., "*In general, what language(s) do you read and speak?*"); the media preference subscale includes 3 items (e.g., "*In what language(s) are the television programs you usually watch?*"); and the ethnic social relations subscale contains 4 items (e.g., "*You prefer going to social gatherings/parties at which the people are of the same ethnicity or are close friends*"). The validity and reliability of this scale have previously been reported to be excellent.[23] Family history of early heart attack in men and women was assessed by inquiring, "*Has your father or brother had a heart attack before the age of 55?*" and "*Has your mother or sister had a heart attack before the age of 65?*", respectively. Participants were asked to select one answer, that is, "yes," "no," or "do not know." The modified Beverage Intake Questionnaire[24] was used to measure daily caloric intake from sugar-sweetened beverages. In particular, daily caloric intakes from sweetened juices, regular soft drinks, sweet tea, coffee with cream and/or sugar, and energy drinks were recorded and summed. The Brief Dietary Assessment Tool for Hispanics[25] was used to measure dietary fat intake from 16 types of food. A higher score indicated a more frequent intake of the 16 types of food during the preceding month. The Brief Dietary Assessment Tool for Hispanics has been reported to be valid and reliable in a previous study,[25] with a reliability correlation coefficient of 0.85 for fat intake. The International Physical Activity Questionnaire (short version)[26] was used to measure the participants' walking and sitting duration (min) per day. The validity and reliability of this scale have been reported to be acceptable.[27] In the study, the International Physical Activity Questionnaire produced reliable data (Spearman's ρ around 0.8), with a median criterion validity of about 0.3.

In addition, trained research staff measured participants' weight using a Tanita WB-110 digital electronic scale (Tanita Corporation of America, Inc., Arlington Heights, IL, USA) and height using a standard stadiometer in the research office. BMI was calculated by dividing the weight (kg) by squared height (m^2). Blood pressure was measured four times (2 each arm) using the Omron Pro IntelliSense Professional Digital Blood Pressure Monitor HEM-907XL (Omron Healthcare, Inc., Schaumberg, Illinois, USA). This commercial oscillometric blood pressure monitor was also used in the recent Systolic Blood Pressure Intervention Trial.[28] The average of these four measurements was recorded.

Statistical analysis

Descriptive statistics were used to describe participants' sociodemographic information, heart attack and diabetes risk factors, and risk perceptions. For logistic regression analyses, heart attack and type 2 diabetes risk perceptions were dichotomized into lower risk or same/higher risk perception. The rationale for this categorization is that participants who underestimate their risks are less likely to modify their lifestyle. In addition, univariate logistic regression analyses were performed to estimate the associations of each independent variable with heart and diabetes risk perceptions; predictors were unadjusted, meaning that they were analyzed in separate models. Finally, multivariate logistic regression analyses were performed to explore the sociodemographic and risk factors associated with a greater perceived risk of suffering a heart attack and developing type 2 diabetes in one's lifetime. In both multivariate logistic regression models, sociodemographic variables, such as age, sex,

education, marital status, U.S. nativity, and acculturation subscales (i.e., language, media, and social), as well as risk factors, such as family history of heart attack, BMI, walking and sitting durations (min) per day, dietary fat intake, and average sugar-sweetened beverage daily calories, were included. Additionally, all predictors were included in the model to adjust for the effects of every other predictor. Smoking habit was not included in the model due to the extremely low number of cases. In addition, multicollinearity diagnostics were performed to check whether all independent variables were highly correlated with each other. The variance inflation factor values of all independent variables ranged from 1.217 to 2.286, and it was concluded that there were no multicollinearity symptoms. Statistical significance was set at $P < .05$. All analyses were conducted using SPSS (version 21.0; IBM, Chicago, IL, USA).

Results

Baseline characteristics

Table 1 shows the sample baseline characteristics. Of the 69 participants, the mean (SD) age was 43.8 ($\pm$ 11.2) years with a range from 24 to 65 years, 47 (68.1%) were women, 50 (72.5%) had a bachelor's or advanced degree, 36 (52.2%) were married/cohabitating, and 53 (76.8%) were employed. In addition, 17 (24.6%) were living with (a) child/children, 44 (63.8%) were born in the U.S., and 5 (7.2%) were current smokers. Based on the Short Acculturation Scale for Hispanics[22], participants were relatively acculturated. Mean BMI (SD) was 31.7 ($\pm$ 4.5) with a range of 24.8 to 42.0 kg/m^2. Six (8.7%) participants reported that their mother or sister had a heart attack before the age of 65, whereas four (5.8%) reported that their father or brother had a heart attack before the age of 65. When combined, nine (13.0%) reported having a family history of early heart attack. Regarding physical activity-related measures, mean (SD) walking and sitting duration per day were 58.2 ($\pm$ 80.4) min and 456.1 ($\pm$ 188.3) min, respectfully. Average dietary fat intake (SD) was 21.3 ($\pm$ 6.1) g, and average sugar-sweetened beverage (SD) daily caloric intake was 418.5 ($\pm$ 168.9) calories.

Description of risk perceptions of heart attack and diabetes

Of the 69 participants, only 12 (17.4%) reported that they were more likely to suffer a heart attack in their lifetime than others of the same age and sex, whereas nearly half (46.4%) perceived themselves to be at lower risk of heart attack (Table 1). Regarding type 2 diabetes risk perception, 34 (49.3%) and 12 (17.4%) of the participants perceived their risks to be higher or similar to that of others, respectively. On the other hand, 20 (29.0%) perceived their risk to be lower than that of others. Finally, only eight (11.6%) participants perceived themselves to be at dual risk of suffering a heart attack and developing type 2 diabetes in their lifetime. Interestingly, 28 (40.5%) of the participants did not perceive themselves to be at a high risk for either outcome.

Perceived risk of heart attack

Table 2 summarizes the results of univariate regression analyses and a multivariate logistic regression analysis predicting a lower perceived risk of heart attack. The three statistically significant predictors in the multivariate logistic regression were as follows: (1) age (5-year

interval, adjusted odds ratio = 1.573; 95% confidence interval, 1.049–2.359; P = .028), (2) BMI (Adjusted odds ratio = .774; 95% confidence interval, .629–.952; P = .015), and (3) walking duration per day (10-min interval, Adjusted odds ratio = 1.417; 95% confidence interval, 1.077–1.863; P = .013). As age increased by 5 years, the likelihood of perceiving a low risk of heart attack increased by 57.3%. In addition, for every 1 kg/m^2 increase in BMI, the likelihood of perceiving a low risk of heart attack decreased by 22.6%. Finally, with every additional 10 min spent on walking every day, the likelihood of one perceiving a lower risk of a heart attack increased by 41.7%. Sex, education, marital status, U.S. nativity, acculturation subscales, family history of heart attack, sitting duration (min) per day, dietary intake of fat, and sugar-sweetened beverage daily calories were not associated with one's perception of heart attack risk (P > .05).

Perceived risk of developing type 2 diabetes

Table 3 presents the results of univariate regression analyses and a multiple logistic regression analysis predicting a lower perceived risk of diabetes. Multiple logistic regression revealed three significant predictors: (1) family history of heart attack (Adjusted odds ratio = 29.707; 95% confidence interval, 1.864–473.560; P = .016), (2) BMI (Adjusted odds ratio = .733; 95% confidence interval, .571–.942; P = .015), and (3) dietary fat intake (Adjusted odds ratio = .838; 95% confidence interval, .996–1.112; P = .044). Individuals who reported that their family member(s) experienced (a) heart attack(s) exhibited an increased likelihood of perceiving themselves to be at a lower risk of diabetes. On the other hand, for every 1 kg/m^2 increase in BMI, the likelihood of perceiving oneself to be at a lower risk of diabetes decreased by 26.7%. Finally, as dietary fat intake score increased by 1 unit, the likelihood of perceiving oneself to be at a lower risk of diabetes decreased by 16.2%. Age, sex, education, marital status, U.S. nativity, acculturation subscales, walking and sitting durations (min) per day, and sugar-sweetened beverage daily calories were not associated with one's perceived risk of developing diabetes (P > .05).

Discussion

This study aimed to evaluate levels of perceived risk of suffering a heart attack and developing type 2 diabetes, and to explore the factors that were significantly associated with risk perception for these conditions among 69 Hispanic adults with overweight/obesity who were enrolled in a weight loss and diabetes prevention trial. We believe that our study findings fill important knowledge gaps in the literature regarding the risk perceptions for heart attack and type 2 diabetes in Hispanic populations. Our study results are consistent with previous study findings.[20, 29] In a recent large survey of community-dwelling adults, who identified themselves as Caucasian, Filipino, Korean, or Hispanic, 14.3% and 46.5% perceived themselves to be at risk of suffering a heart attack and developing type 2 diabetes in their lifetime, respectively. Only 9.3% perceived a dual risk of heart attack and type 2 diabetes. However, it is important to highlight that the present study exclusively enrolled Hispanic adults with overweight/obesity who were at risk of developing type 2 diabetes, whereas the previous survey included community-dwelling adults regardless of their BMI status. Thus, we anticipated the percentage of individuals with risk perceptions in the present study to be higher than that in the previous survey involving community-dwelling adults;

however, the findings were similar. The underestimation of the perceived risks of heart attack and type 2 diabetes in our study sample may suggest a lack of knowledge/awareness of the risk factors and/or demonstrate an optimistic bias (i.e., the tendency of an individual to underestimate their risks of developing health problems[30]), which is consistent with previous study findings.[17, 31 32, 33]

In the present study, we also found that older age, lower BMI, and longer walking duration (min) per day were significantly associated with a low perceived risk of heart attack, even after controlling for other potential factors. Given the public health campaigns regarding obesity prevention and promotion of regular physical activity over the past few decades, the observed associations of lower BMI and longer walking duration (min) with a low perceived risk of heart attack are intuitive. In contrast, the finding in which older individuals were less likely to perceive themselves to be at risk than younger individuals, seems to be counterintuitive. The incidence of heart attack increases with age[34], and aging is a well-known nonmodifiable risk factor for heart attack.[35] However, this age-related finding is consistent with that from previous studies that demonstrated that older individuals were more likely to underestimate their risk of CVD events.[36, 37] In particular, previous research demonstrated that such underestimation of CVD risk could be applicable to older participants. It was found that participants aged 65 or above were more likely to underestimate their CVD risks compared to adults aged 45 to 65,[38] and this leads to a lack of motivation to adopt a healthy lifestyle.[37]

Regarding the perceived risk of type 2 diabetes, lower BMI and dietary fat intake were related to a low perceived risk of type 2 diabetes, whereas individuals with a family history of heart attack were more likely to underestimate their risk of type 2 diabetes. Consistent with our study findings, previous studies have shown that habitual fat consumption or BMI is related to higher diabetes risk perception.[20, 39] In the analyses of the 2011–2014 National Health and Nutrition Examination Survey data by Yang et al.,[39] Hispanic and non-Hispanic black populations perceived higher diabetes risk when they had poor-to-fair dietary habits, compared with the other ethnic/racial groups. In addition, individuals with higher BMI reported a greater perceived diabetes risk compared to those with lower BMI.

To our knowledge, measuring a level of acculturation in the context of perceived risk of heart attack and type 2 diabetes is not common. However, the study including the 2011–2016 National Health and Nutrition Examination Survey data reported that being foreign-born was significantly associated with decreased diabetes risk perception compared to being a U.S. native, after adjusting for other potential confounding factors.[40] Another study also found that Hispanics with less acculturation were more likely to underestimate their risks for heart diseases as well as diabetes.[8] In our study, in addition to assessing U.S. and non-U.S. nativity, we measured the participants' acculturation levels using a valid and reliable scale that was developed for Hispanics. However, none of the acculturation subscales were associated with a high perceived risk of type 2 diabetes. This contrasting finding could be attributed to differences in the representativeness of the study samples between the studies. In the present study, all participants were either U.S.- or non-U.S.-native Hispanic adults with overweight/obesity, who have been resident in the U.S. for 10 years, whereas the other two studies included Hispanic samples with a wide range of acculturation levels.

One of the interesting findings was that having a family history of heart attack was associated with a reduction in the perceived risk of type 2 diabetes. The Hispanic sample in this study might not have been aware that type 2 diabetes is also an important risk factor for heart attack. In fact, only 11.6% of the participants perceived themselves to be at risk of both heart attack and type 2 diabetes. Age and physical inactivity are also risk factors for both heart attack and type 2 diabetes; nevertheless, these risk factors were not associated with a perceived high risk of type 2 diabetes in this Hispanic sample. Unless individuals accurately perceive their risk of or susceptibility to heart attack or type 2 diabetes, they may not be motivated to engage in healthy lifestyle behaviors.[41] Finally, this study highlights the importance of incorporating health-related messages delivered to people to increase awareness of their risks and minimize their optimistic biases.

Strengths and limitations

One of the strengths of this study was the use of reliable and valid measures of physical activity and dietary habits. Another strength was that the acculturation scale, specifically developed for Hispanic adults in the U.S., was used in this study, and three subdomains (i.e., language preference, media preference, and ethnic social relations) of level of acculturation were examined in relation to perceived risk. However, several limitations should be considered. First, the sample size was relatively small, resulting in a large variability of the results. In addition, given that the study enrolled only Hispanic participants who were highly motivated to participate in the weight loss and diabetes prevention trial and those who were educated and were young adults or middle age adults, the results may not be generalizable to a larger Hispanic population or other racial and ethnic groups. Lastly, some data, including family history of heart attack and diabetes were assessed by self-report. Thus, a recall bias may occur.

Conclusions

The results of this study suggest that Hispanic adults with overweight/obesity underestimate their risk of heart attack and type 2 diabetes, and highlight the importance of assessing their risk perceptions prior to encouraging lifestyle modifications. Given the increasing prevalence of obesity and type 2 diabetes in the U.S., health education and public campaigns, specifically targeting high-risk Hispanic populations, are necessary to improve awareness of their risks of heart attack and type 2 diabetes. Finally, the study's findings will need to be confirmed with a large study including national representative samples (e.g., different education and acculturation levels) of Hispanic Americans at risk of developing type 2 diabetes.

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Table 1.

Baseline characteristics (N = 69)

Sociodemographics		Mean (SD) or %(n) [Range]
Age (years)	-	43.8 ±11.2 [24–65]
Gender	Men	31.9 (22)
	Women	68.1 (47)
Education	Completed college or graduate school	72.5 (50)
	Completed high school or some college education or less than high school	27.5 (19)
Marital status	Married/cohabitating	52.2 (36)
	Single/Divorced/Widowed	47.8 (33)
Employment	Employed for paid	76.8 (53)
	Unemployed/home maker/ disable/others	23.2 (16)
US Born	Yes	63.8 (44)
Self-reported ethnicity	Mexican	56.5 (39)
	Salvadoran	13.0 (9)
	Nicaraguan	8.7 (6)
	Puerto Rican	4.3(3)
	Columbian	4.3(3)
	Guatemalan	2.9 (2)
	Peruvian	3.7 (2)
	Cuban	1.4 (1)
	Spaniard	1.4 (1)
	Honduran	1.4 (1)
	Ecuadoran	1.4 (1)
	Panamanian	1.4 (1)
	Chilean	1.4 (1)
Acculturation[a]	Language subscale	3.8 ± 0.9 [1.4–5.0]
	Media subscale	4.5 ± 0.7 [2.0–5.0]
	Social subscale	3.2 ± 0.6 [2.0–5.0]
Living with child(ren)	Yes	24.6 (17)
Cardiovascular risk factors		
American Diabetes Association Diabetes Risk score		5.4 (1.7) [2–9]
Smoking	Yes	7.2 (5)
Mean Body Mass Index (kg/m^2)		31.7 ± 4.5 [24.8–42.0]
Mean systolic blood pressure (mmHg)[b]		120.2 ± 14.4 [91.5–152.3]
Mean diastolic blood pressure (mmHg)[b]		75.7 ± 9.5 [59.0–96.5]

Sociodemographics		Mean (SD) or %(n) [Range]
Has your mother or sister had a heart attack before age 65?	Yes	8.7 (6)
Has your father or brother had a heart attack before age 55?	Yes	5.8 (4)
Has your mother, sister, father, or brother had a heart attack?	Yes	13.0 (9)
Physical activity (International Physical Activity Questionnaire)		
Walk minutes/day		58.2 ± 80.4 [0–480.0]
Sitting minutes/day		456.1 ± 188.3 [120.0–900.0]
Diet		
Dietary intake of fat[c]		21.3 ± 6.1 [8.0–40.0]
Total daily sugar-sweetened beverage (The Modified Beverage Intake Questionnaire)		
Sugar-sweetened beverage calories		134.7 ± 168.9 [0–1269.1]
Sugar-sweetened beverage grams		418.5 ± 429.1 [0–2765.8]
CVD and diabetes risk perception		
Compared to other people who are your same age and sex, how likely do you think it is that you could have a heart attack in your lifetime?	More/somewhat likely	17.4 (12)
	Same	36.2 (25)
	Somewhat/much less likely	46.4 (32)
The following question applies only for those individuals who do NOT have diabetes. If you have diabetes, please select "not applicable". Compared to other people who are your same age and sex, how likely do you think it is that you could develop type 2 diabetes?	More/somewhat likely	49.3 (34)
	Same	17.4 (12)
	Somewhat/much less likely	29.0 (20)
	Not applicable (taking oral medication for type 2 diabetes)	4.3 (3)
Combined risk perception between heart attack and type 2 diabetes	High perceived risk for both heart attack and type 2 diabetes	11.6 (8)
	High perceived risk for heart attack only	5.8 (4)
	High perceived risk for type 2 diabetes only	37.7 (26)
	High perceived risk for neither heart attack nor type 2 diabetes	40.5 (28)
	Not applicable	4.3 (3)

[a] The Short Acculturation Scale for Hispanics was used. A potential score ranges from 1 to 5 and a higher score indicates greater acculturation. An average score above 2.99 indicates more acculturated.

[b] Systolic and diastolic blood pressure information was missing for one patient (n=68).

[c] Brief Dietary Assessment Tool for Hispanics was used to measure the fat intake.

Table 2.

Predicting a low perceived risk of heart attack in Latinos (N = 69)

	Unadjusted			Adjusted[a]		
	OR	95% CI	*P* value	OR	95% CI	*P* value
Age[b]	1.483	1.145 to 1.920	.003	1.573	1.049 to 2.359	.028
Female gender	.808	.293 to 2.228	.680	3.149	.568 to 17.448	.189
Completed college or graduate school	.527	.181 to 1.535	.240	.259	.040 to 1.687	.158
Married/cohabitating	2.187	.832 to 5.754	.113	1.356	.323 to 5.688	.677
US born	.702	.262 to 1.880	.481	1.065	.222 to 5.114	.938
Acculturation subscale[c]						
Language	.855	.493 to 1.481	.575	1.157	.380 to 3.520	.798
Media	.778	.376 to 1.612	.500	.314	.055 to 1.780	.190
Social	1.228	.535 to 2.823	.628	1.025	.237 to 4.422	.974
Family history of heart attack	.914	.223 to 3.742	.901	2.559	.260 to 25.189	.421
BMI (kg/m^2)	.892	.796 to 1.001	.052	.774	.629 to .952	.015
Walking minutes/day[d]	1.237	1.031 to 1.486	.022	1.417	1.077 to 1.863	.013
Sitting minutes/day[d]	.977	.951 to 1.004	.099	.990	.946 to 1.035	.650
Dietary intake of fat[e]	.919	.843 to 1.002	.056	.910	.795 to 1.042	.174
Total sugar-sweetened beverage calories (kcal/day)[f]	.996	.990 to 1.001	.091	.997	.989 to 1.004	.379

Abbreviations: BMI, body mass index; CI, confidence interval; OR, odds ratio.

[a] All variables were included in the multivariate logistic regression model.

[b] Age variable was computed to have a 5-year interval

[c] The Short Acculturation Scale for Hispanics was used. A potential score ranges from 1 to 5 and a higher score indicates greater acculturation. An average score above 2.99 indicates more acculturated.

[d] International Physical Activity Questionnaire (short) was used. Walking and sitting minute variables were computed to have 10-minute intervals

[e] Brief Dietary Assessment Tool for Hispanics was used.

[f] The modified Beverage Intake Questionnaire was used.

Table 3.

Predicting a low perceived risk of diabetes in Latinos (N = 69)

	Unadjusted			Adjusted[a]		
	OR	95% CI	*P* value	OR	95% CI	*P* value
Age[b]	1.325	1.020 to 1.722	.035	1.396	.876 to 2.223	.160
Female gender	1.600	.492 to 5.207	.435	2.996	.451 to 19.909	.256
Completed college or graduate school	1.576	.443 to 5.610	.483	.671	.084 to 5.370	.707
Married/cohabitating	1.333	.465 to 3.825	.593	1.142	.204 to 6.403	.880
US born	1.368	.443 to 4.227	.586	1.944	.312 to 12.092	.476
Acculturation subscale[c]						
Language	.786	.428 to 1.442	.436	.842	.241 to 2.716	.773
Media	1.050	.458 to 2.408	.909	.494	.088 to 2.773	.423
Social	1.238	.500 to 3.070	.644	1.107	.258 to 4.750	.891
Family history of heart attack	3.500	.828 to 14.786	.088	29.707	1.864 to 473.560	.016
BMI (kg/m^2)	.876	.767 to 1.001	.053	.733	.571 to .942	.015
Walking minutes/day[d]	1.077	.996 to 1.164	.063	1.122	.984 to 1.279	.086
Sitting minutes/day[d]	1.008	.981 to 1.036	.565	1.052	.996 to 1.112	.072
Dietary intake of fat[e]	.912	.828 to 1.006	.064	.838	.706 to .996	.044
Total sugar-sweetened beverage calories (kcal/day)[f]	.998	.994 to 1.003	.477	1.001	.996 to 1.005	.716

Abbreviations: BMI, body mass index; CI, confidence interval; OR, odds ratio.

[a] All variables were included in the multivariate logistic regression model.

[b] Age variable was computed to have a 5-year interval

[c] The Short Acculturation Scale for Hispanics was used. A potential score ranges from 1 to 5 and a higher score indicates greater acculturation. An average score above 2.99 indicates more acculturated.

[d] International Physical Activity Questionnaire (short) was used. Walking and sitting minute variables were computed to have 10-minute intervals

[e] Brief Dietary Assessment Tool for Hispanics was used.

[f] The modified Beverage Intake Questionnaire was used.