Published in final edited form as:
J Transcult Nurs. 2009 July ; 20(3): 278–285. doi:10.1177/1043659609334852.

Association of Acculturation Status With Beliefs, Barriers, and Perceptions Related to Cardiovascular Disease Prevention Among Racial and Ethnic Minorities

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Abstract

Acculturation has been correlated with traditional cardiovascular disease risk factors. The purpose of this study was to examine the association between acculturation and health beliefs, barriers, and perceptions related to cardiovascular disease prevention. Racial/ethnic minority participants in the Family Intervention Trial for Heart Health were included in this analysis. Less acculturated minorities were more likely to have health beliefs that may impede prevention, have greater perceived susceptibility to disease, and believe in an external locus of control. Evaluating acculturation in clinical practice may be an opportunity to promote awareness, healthy behaviors, and prevention among immigrants.

Keywords

acculturation; cardiovascular disease; prevention; minority; health beliefs; race; ethnicity

Acculturation the process by which immigrants adopt the attitudes, values, customs, beliefs, and behaviors of a new country, has been associated with traditional cardiovascular disease (CVD) risk factors including obesity, hyperlipidemia, and hypertension (Abraido-Lanza, Armbrister, Florez, & Aquirre, 2006; Abraído-Lanza, White, & Vásquez, 2003; Bongard, Pogge, Halime, Rohrmann, & Volker, 2002; Fitzgerald et al., 1998–1999; Lizarzuburu & Palinkas, 2002; Moran et al., 2007). Understanding the relationship between acculturation and CVD risk is essential because of the increasing number of immigrants living in the United States and the disproportionate rate of morbidity and mortality attributable to CVD among racial/ethnic minorities (Lollock, 2001; Rosamond et al., 2007).

Previous research has documented an association between acculturation and health care practices among racial/ethnic minorities. There is increasing evidence that Hispanics who become more acculturated to mainstream American sociocultural practices engage in unfavorable health behaviors to a greater extent and experience higher mortality rates when compared with their less acculturated counterparts (Hummer, Rogers, Nam, & LeClere, 1999; Lara, Gamboa, Kahramanian, Morales, & Bautista, 2005; Singh & Siahpush, 2001). Greater levels of acculturation have been associated with higher saturated fat intake and diminished fruit and vegetable consumption (Neuhouser, Thompson, Coronado, & Solomon, 2004) and a decreased consumption of fiber (Elder et al., 1991). Additionally, more acculturated females have been shown to engage in high-risk behaviors such as smoking (Otero-Sabogal, Sabogal, Pérez-Stable, & Hiatt, 1995). Conversely, being more acculturated has been associated with protective factors such as being more likely to participate in physical activity (Berrigan, Dodd, Troiano, Reeve, & Ballard-Barbash, 2006). Furthermore, researchers have found that greater acculturated Hispanics were more likely to have preventive screenings for cholesterol and blood pressure and routine check-ups when compared with less acculturated

Hispanics (Jurkowski & Johnson, 2005). Regarding health perceptions, the literature suggests that more acculturated Hispanics perceive themselves as being in better health than less acculturated individuals (Finch, Hummer, Reindl, & Vega, 2002), despite a medical trend that attributes higher levels of acculturation to greater risk factors for CVD. Additionally, the concepts of fatalism and acceptance are prevalent within the Hispanic community leading some to believe that disease is hereditary and/or determined by God. The literature also suggests a distrust of doctors among Hispanics (Singh & Siahpush, 2001).

Although previous research has identified a relationship between level of acculturation and CVD risk factors, the effect of acculturation on health beliefs, barriers, and perceptions to CVD prevention has not been addressed. This correlation may represent a potential mechanism through which acculturation and risk factors are associated. The purpose of this study was to examine the association between acculturation and health beliefs, barriers, and perceptions related to heart disease prevention among an ethnically diverse population participating in a novel screening and educational outreach program targeted to family members of patients hospitalized with CVD. A secondary objective was to evaluate the prevalence of traditional CVD risk factors among racial/ethnic minorities by level of acculturation. Given the diverse racial/ethnic makeup of the U.S. population and the health disparities that persist among minorities, it is imperative to examine potential causal pathways that may alleviate this burden.

Design and Subjects

This was a cross-sectional substudy of minority participants enrolled in the National Heart, Lung, and Blood Institute–sponsored Family Intervention Trial for Heart Health (FIT Heart; $N = 179$; mean age 43 ± 13 years, 69% female, 65% Hispanic). Briefly, FIT Heart is a 1-year randomized controlled clinical trial among family members/cohabitants of patients hospitalized with CVD at New York Presbyterian Hospital/Columbia University Medical Center campus. Participants in FIT Heart were adult family members ($N = 501$, 66% female, 36% non-White, mean age 48 years) of patients admitted to the hospital with atherosclerotic CVD. Subjects were eligible for the primary prevention of CVD and were excluded if they were diabetic or pregnant. To be eligible, participants had to be a blood relative or cohabitant of a hospitalized patient, be aged between 20 and 79 years inclusive, have no history of heart disease or diabetes, be English or Spanish speaking, and live within a 3-hour commute of the medical center. Subjects were recruited in person while visiting their family members at the time of hospitalization. The purpose of FIT Heart was to test the effectiveness of a hospital-based standardized screening and educational intervention to increase adherence to national CVD prevention goals versus usual care. The study was approved by the Institutional Review Board of Columbia University Medical Center.

Each participant completed a standardized questionnaire including demographic data, past medical history, lifestyle (i.e., smoking, physical activity), medication use, and family history of CVD. Bilingual staff members were available to assist participants, and all forms were available in English and Spanish. Trained health care professionals performed standardized cardiovascular risk factor screenings including blood pressure, height, weight, body mass index (BMI), waist circumference, fasting lipids, glucose, and high-sensitivity C-reactive protein in the Columbia University General Clinical Research Center (GCRC) using a standard protocol.

Acculturation

Acculturation is the process by which immigrants adopt the attitudes, values, customs, beliefs, and behaviors of a new country (Abraido-Lanza et al., 2006). The Short Acculturation Scale for Hispanics (SASH) developed by Marín and colleagues was used to assess level of acculturation among participants (Marín, Sabogal, Marín, Otero-Sabogal, & Pérez-Stable, 1987). This scale has been tested among diverse racial/ethnic populations and has high rates

of reliability, α = .92, and validity, .69, $p < .001$. Respondents were asked to answer the following four language frequency–based questions: In general, what language(s) do you read and speak? What language(s) do you usually speak at home? In which language(s) do you usually think? What language(s) do you usually speak with your friends? Responses were based on a 5-point Likert-type scale (1 = *only Spanish/Other*; 2 = *Spanish or Other better than English*; 3 = *both equally*; 4 = *English better than Spanish/Other*; 5 = *only English*). The "other" language category was added to include participants who may have been bilingual in English and a language other than Spanish. A total score was calculated and averaged, resulting in a mean score, with <3 indicating lower acculturation and ≥3 indicating greater acculturation. These cut points were chosen based on previously published reports (Marín, Sabogal, Marín, Otero-Sabogal, & Pérez-Stable, n.d.). The SASH language-based scale was chosen because language is thought to capture a dynamic dimension of acculturation that may indicate the changing degree of integration into mainstream culture (Coronado, Thompson, McLerran, Schwartz, & Koepsell, 2005). Participants were also asked to report on their country of birth and, if foreign-born, year of immigration.

Health beliefs, barriers, and perceptions—Health beliefs, barriers, and perceptions related to CVD prevention were assessed using standardized questions taken from instruments validated within other chronic disease populations. Health beliefs, as described in the health belief model, include the susceptibility, severity, benefits, barriers, and self-efficacy one feels toward health (Becker, 1974). The health belief questions used were adapted from the scales developed by Champion and colleagues, which have documented validity, α = .91, and reliability, $r = .70$ (Champion, 1995, 1999; Champion et al., 2004). As shown in Table 2, the health belief questions addressed respondents' thoughts and feelings when thinking about heart disease. Our operational definition of health barriers is one's opinion of the tangible and psychological costs of taking the advised action (Rimer & Glanz, 2005). Health barrier–related questions involved factors that would inhibit participants from taking prescribed medications. The questions used to evaluate barriers and perceptions related to CVD prevention were adapted from previous surveys administered among those screened for breast cancer, CVD, and hypertension. Analyses from these surveys have indicated moderate reliability and validity that vary with each indicator measured (Jette, Cummings, Brock, Phelps, & Naessens, 1981; Mosca et al., 2006). Health perceptions are the subjective ratings by the affected individual about his/her health status (Wilson & Cleary, 1995). Our health perception questions dealt with feelings of susceptibility to heart disease, prevention, and ultimately control.

Respondents were asked to provide their level of agreement with statements on health beliefs (strongly agree, somewhat agree, neutral, somewhat disagree, or strongly disagree), barriers (very likely, likely, neutral, unlikely, or very unlikely), and perceptions (agree, neutral, or disagree). Values from these Likert-type scales were analyzed as strongly/somewhat agree versus strongly/somewhat disagree, very likely/likely versus very unlikely/unlikely, and agree versus disagree, respectively. Similarly to previous research conducted using Likert-type scales, all neutral responses were removed from analyses. Conducting analyses with neutral responses included did not materially alter the results (Krosnick et al., 2002).

Cardiometabolic risk factors—Trained health care professionals performed standardized cardiometabolic risk factor assessments including BMI and waist circumference. The Gladys Block Food Frequency Questionnaire was used to measure saturated fat intake.

Obesity measurements—BMI was calculated by measuring height using a precision, wall-mounted, standardized height rod that is located in each examination room of the Columbia University GCRC. The subject was barefoot or wearing only socks, weight distributed evenly on both feet, and the head positioned in the horizontal plane. Measurement was made and recorded within 0.1 cm. Body weight was taken using research grade, portable, Healthometer

scales and recorded to the nearest 1.00 lb. BMI was calculated directly by the standard formula: weight (kg)/height $(m)^2$. In this study, overweight was defined as BMI 25.0 to 29.9 kg/m^2, and obesity was defined as BMI ≥30 kg/m^2.

Waist circumference was measured by trained examiners using a U.S. government standard protocol (National Institutes of Health, 1998). An inelastic, standard tape measure was placed in a horizontal plane around the abdomen at the level of the marked point on the right side of the trunk. The measurement was taken at the end of a normal expiration, without the tape compressing the skin. Measurements were recorded to the nearest 0.1 in. In this study, increased waist circumference was defined as ≥35 in. in women and ≥40 in. in men.

Dietary assessment—The Gladys Block Food Frequency Questionnaire-98 was used to measure dietary fat intake among study participants. Gladys Block is a validated food survey of 110 food items that was designed to estimate usual and customary intake of a wide array of nutrients including dietary fat (Block, Block, & Block, 1998). The food list for this questionnaire was developed from the NHANES III dietary recall data. The nutrient database was developed from the USDA Nutrient Database for Standard Reference. Individual portion size was asked for each food, and pictures were provided to enhance accuracy of quantification. The questionnaire was scored mechanically, and output analysis including an estimate of micronutrients, macronutrients, and calorie intake was provided. A diet low in saturated fat was indicated by the consumption of <7% calories from saturated fat.

Data management and statistics—All data were collected on duplicate standardized forms and double entered into a Microsoft Access database and then exported to SAS, version 9.1 (SAS Institute, Inc., Cary, NC) for purposes of statistical analysis. Variables outside specified ranges were removed from the analysis. Categorical data are presented as frequencies and percentages. Continuous data are presented as means and standard deviations. Comparisons across race/ethnic groups were made using the chi-square test for categorical data and Student's *t* test for continuous data. Logistic regression models were calculated with each of the health belief, barrier, and perception statements as dependent variables and level of acculturation as the predictor variable. Multivariable regression models were adjusted for potential confounders including age, sex, education, and health insurance. Statistical significance was set at $p < .05$.

Results

The demographic characteristics and CVD risk factors of racial/ethnic minority subjects enrolled in FIT Heart are provided in Table 1 by level of acculturation. The majority of the racial/ethnic minorities enrolled in FIT Heart were Hispanic (67%) and Hispanic subjects descended from the Dominican Republic (65%). Other ethnicities represented were African Americans, Asians, and others. Among racial/ethnic minority subjects, most preferred another language to English (52%), 58% were born outside the United States, and 37% were considered less acculturated (mean score <3.0). There were no statistically significant differences in CVD risk factors although less acculturated minorities tended to eat less saturated fat and exercise less than those who were more acculturated.

Table 2 describes the health beliefs reported among less acculturated versus more acculturated minority subjects. More acculturated minorities were more likely to report feeling scared ($p = .01$), nervous ($p = .01$), or upset ($p = .03$) when thinking about heart disease compared with less acculturated minorities. After statistical adjustment for potential confounders including age, gender, education, and insurance, the associations between acculturation and these health beliefs remained significant ($p = .02$, $p = .007$, and $p = .02$, respectively). Paradoxically, less acculturated minorities had greater perceived susceptibility to developing heart disease (60%

vs. 32%, $p = .004$) compared with more acculturated minorities, and this association remained significant in a multivariable model ($p = .03$). Furthermore, less acculturated minorities were also more likely to agree that they were afraid to have a CVD risk factor screening because they might find out something is wrong when compared with more acculturated minorities (32% vs. 17%, $p = .0003$), although this association became non-significant in a multivariable model. There were no significant associations between acculturation and barriers to CVD prevention (Table 3).

Health perceptions among minority subjects by level of acculturation are presented in Table 4. Less acculturated minorities were more likely to agree that when you try to prevent illness, it is more trouble than it is worth compared with more acculturated minorities (42% vs. 21%, $p = .02$). After adjusting for age, sex, education, and insurance, this association was nonsignificant. Less acculturated minorities were significantly more likely to agree that it is the doctor who can help you the most (77% vs. 41%, $p < .0001$) and that God or a higher power can be most helpful (58% vs. 33%, $p = .02$) compared with more acculturated minorities. In a multivariable model controlling for potential confounders (Table 5), the association between acculturation and the perception that it is the doctor who can help the most remained significant ($p = .002$), although the association between acculturation and the perception that God or a higher power can be most helpful became nonsignificant. Additionally, in the multivariable analysis the idea that if you take care of yourself you can avoid heart disease became significant ($p = .03$).

Discussion

This study showed an association between being less acculturated and having health beliefs and perceptions that may serve as potential barriers to CVD prevention, including a fear of being screened, believing that prevention is more trouble than it is worth, and having an external locus of control. In contrast, less acculturated minorities reported greater fear of CVD, a higher perceived susceptibility to disease, and were almost twice as likely to state that their chances of getting CVD in the next few years are great compared with more acculturated minorities. Perceived susceptibility has been correlated with taking preventive action in the health belief model, which suggests that those who feel most susceptible to disease are most likely to take action (Becker, 1974).

Our data show that less acculturated minorities express more fear about being screened for CVD and are consistent with other studies that have found greater level of acculturation to be associated with higher utilization of preventive screenings and services. Two previous research studies conducted among Hispanic women showed greater knowledge about the Pap test and greater utilization of cervical cancer screenings among more acculturated women (Harmon, Castro, & Coe, 1996; Shah, Zhu, Wu, & Potter, 2006). Additionally, Coronado and colleagues found that, among less acculturated women, barriers to cervical cancer prevention included not wanting to be screened out of fear of finding disease (Coronado, Thompson, Koepsell, Schwartz, & McLerran, 2004). Our finding is of concern because recent research has shown a significant association between personal awareness of CVD risk factors and preventive action (Christian, Rosamond, White, & Mosca, 2007; Mosca et al., 2006). Future prevention programs and efforts should reach out to minority populations that may be fearful of screenings and educate them about the potential benefits of early detection and modification of CVD risk factors.

Having an internal locus of control is the belief that the onset and progress of disease is a result of one's own behavior rather than a result of uncontrollable, external influences (Becker, 1974). In this study, less acculturated minority subjects were more likely to exhibit an external locus of control related to CVD compared with more acculturated minorities. Less acculturated

minorities felt that it was the doctor or God/a higher power who could help prevent CVD the most, rather than themselves. A recent national survey on trends and disparities in CVD showed that belief in a higher power controlling destiny may be a barrier to making lifestyle changes (Christian et al., 2007). The external locus of control exhibited could be, in part, because of a lack of awareness among minorities that the majority of CVD risk factors are modifiable through lifestyle changes or a general lack of awareness about the risk factors for heart disease. In the multivariable model, the idea of taking care of one's self to avoid heart disease became significant. Although the relationship between acculturation and health beliefs seems somewhat inconsistent, this may be representative of the complexities that exist between acculturation status and health. Previous studies that have researched this concept have produced inconsistent results (Montez & Eschback, 2008). An examination of locus of control and length of residence in the United States may be useful to explain this discrepancy.

Our study has limitations that should be considered in the interpretation of results. Although a large, diverse sample of minorities was obtained, subgroup analyses contributed to a smaller sample size, thus limiting power to detect differences among groups, especially with respect to CVD risk factors. Our study had a large representation of Hispanics from the Dominican Republic, which can add to the representation of this subgroup in health research, but it may not generalize to all racial/ethnic minorities. Our sample was also comprised primarily of individuals who had been living in the United States for more than 10 years. Future research is needed to assess CVD beliefs, barriers, and perceptions among more recent immigrant populations who have not been as heavily influenced by American culture. Although questions regarding barriers to medications were asked, it would have been appropriate to include more detailed questions related to physical activity and dietary barriers. Additionally, Likert-type scales were collapsed during analysis to combine categories, and in some cases, the neutral category was dropped. This was because of our small sample size. Fewer choice categories revealed stronger differences between groups. Health belief, barrier, and perception questions were adapted from tools that had been used in other chronic disease populations. It would have been beneficial to have tools that had been tested within the context of a CVD population among minorities. The development of this type of instrument is warranted for future research. Although logistic regression was used in the analysis, doing so in small samples may lead to high standard errors. However, this was an exploratory analysis and findings should be considered for future analyses rather than as definitive associations. Additionally, the health belief, barrier, and perception questions measured in the study were not specifically tailored for Hispanics, thus inconsistencies in responses may have occurred.

Conclusion

We documented an association between reduced levels of acculturation and several health beliefs that may impede adoption of CVD prevention strategies among racial and ethnic minorities. However, less acculturated minorities in our study showed a greater perceived susceptibility to CVD, which may represent a unique opportunity for education and early intervention. Our data suggest that health care providers should consider the assessment of acculturation to identify minority populations who may benefit from more intensive CVD prevention counseling. Future research and public health initiatives should consider the process of acculturating as an opportune time to encourage awareness of CVD risk factors, healthy behaviors, increased screenings, and overall prevention among minorities entering the U.S. health care system.

Acknowledgments

This study was funded by a National Institutes of Health (NIH) Research Project Award to Dr. Mosca (R01 HL 075101-01A1). This work was supported in part by the NIH-funded General Clinical Research Center at Columbia

University and a NIH Research Career Award to Dr. Mosca (K24 HL076346-01A1). We acknowledge Heidi Mochari, RD, MPH, for coordinating the trial and Brooke Fischer, MS, Karen Ochoa, MA, Syncia Sabain, MA, and Ming Liao, BS, for their assistance with data collection.

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Table 1

Characteristics and CVD Risk Factors by Acculturation Status (N = 179)

Characteristic	More Acculturated (n = 112)	Less Acculturated (n = 67)
Female	70%	66%
High school education	70%	47%*
Employed/student	37%	33%
Married/living with someone	51%	57%
No health insurance	17%	33%
Nonsmoker	86%	86%
Age[a]	42 ± 13	45 ± 13
Body mass index[a]	29.7 ± 5.4	29.57 ± 6.7
Waist circumference[a]	36.9 ± 6.4	36.7 ± 5.1
Days/week exercise[a]	1.6 ± 1.9	1.1 ± 1.7
Minutes/day exercise[a]	23.1 ± 30.7	16.7 ± 29.2
Percentage saturated fat intake[a]	10.6 ± 2.5	9.9 ± 2.5

Note: CVD = cardiovascular disease.

[a] Values are given as mean ± standard deviation.

* $p < .05$.

Table 2

Health Beliefs by Acculturation Status (N = 179)

Beliefs	% More Acculturated (n = 112)	% Less Acculturated (n = 67)
The thought of heart disease scares me.	95	81*
When I think about heart disease, I feel nervous.	81	61*
When I think about heart disease, I get upset.	51	31*
When I think about heart disease, I get depressed.	33	34
When I think about heart disease, I get jittery.	31	36
When I think about heart disease, my heart beats faster.	21	38*
When I think about heart disease, I feel uneasy.	43	49
When I think about heart disease, I feel anxious.	37	35
It is likely that I will get heart disease.	54	71
My chances of getting heart disease in the next few years are great.	32	60*
I feel I will get heart disease sometime during my life.	58	67
I am afraid to have a heart disease risk factor screening because I might find out something is wrong.	17	32*

Note: Answers were based on a 5-point Likert-type scale. Values represent a response of strongly/somewhat agree versus strongly/somewhat disagree.

* $p < .05$.

Table 3

Health Barriers by Acculturation Status (N = 179)

Barrier	% More Acculturated (n = 112)	% Less Acculturated (n = 67)
How likely is it that you would stop taking a prescribed medication if:		
The medicine was costing a lot of money.	40	45
You felt worse when you took the medicine.	68	60
Taking the medicine was hard to fit into your daily routine.	14	24
You heard that taking the medicine might be dangerous to your health, even though your doctors prescribed it for you.	54	39

Note: Respondents were asked to answer on a 5-point Likert-type scale. Values represent a response of very likely/likely or very unlikely/unlikely.

Table 4

Health Perceptions by Acculturation Status (N = 179)

Perception	% More Acculturated (n = 112)	% Less Acculturated (n = 67)
Sometimes it seems that when you try to prevent illness, it is more trouble than it is worth.	21	42*
If you take care of yourself, you can avoid getting heart disease.	87	96
Chances are when you get sick it is because you did not take care of yourself.	59	76*
To avoid getting heart disease, it is the doctor who can help you the most.	41	77*
Home remedies are often better than the drugs that the doctor prescribed.	21	9
To avoid heart disease, it is God or a higher power that can help you the most.	33	58*

Note: Respondents were asked to answer on a 3-point Likert-type scale. Values represent a response of agree or disagree.

* $p < .05$.

Table 5

Multivariable Models Evaluating Acculturation and Health Beliefs, Barriers, and Perceptions[a]

Outcome Variable	Acculturation (Less vs. More), Odds Ratio (*p* Value), 95% Confidence Interval
The thought of heart disease scares me.	0.22 (.02), 0.67–0.79
When I think about heart disease, I feel nervous.	0.30 (.007), 0.13–0.72
When I think about heart disease, I get upset.	0.38 (.02), 0.17–0.86
When I think about heart disease, my heart beats faster.	2.09 (.10), 0.87–4.98
My chances of getting heart disease in the next few years are great.	2.51 (.03), 1.08–5.82
I am afraid to have a heart disease risk factor screening because I might find out something is wrong.	2.06 (.13), 0.82–5.19
Sometimes it seems that when you try to prevent illness, it is more trouble than it is worth.	2.16 (.10), 0.87–5.38
If you take care of yourself, you can avoid getting heart disease.	2.54 (.03), 1.09–5.92
To avoid getting heart disease, it is the doctor who can help you the most.	3.96 (.002), 1.66–9.49
To avoid heart disease, it is God or a higher power that can help you the most.	2.41 (.06), 0.96–6.07

[a] Adjusted for age, gender, education, and health insurance status.