Original Study

Anger Types: Heritability and Relation to Blood Pressure, Body Mass Index, and Left Ventricular Mass

Lillian Gleiberman, PhD;[1] Tiffany A. Greenwood, PhD;[2,3] Amy Luke, MD;[4]
Maria C. Delgado, MD;[1] Alan B. Weder, MD[1]

*The relationship between anger and cardiovascular morbidity has not been investigated among Mexican Americans. This exploratory study examined the heritability of anger types and their relationship to cardiovascular variables in samples of unrelated and related Mexican Americans residing near Chicago, Illinois. All of the anger variables of the Spielberger Anger Expression Scale (in, out, control, total expression) had significant heritabilities. Using the total sample of related individuals, higher female anger-out scores were associated with greater left ventricular mass after correction for height to the 2.7 power (LVM/HT$^{2.7}$), systolic blood pressure, and diastolic blood pressure. Females had positive, significant associations for body mass index with LVM/HT$^{2.7}$, systolic blood pressure, and diastolic blood pressure; among males, these variables were similarly but less strongly related. Anger (*coraje *in Spanish) is discussed in the context of folk medicine as a risk factor for cardiovascular morbidity.*
J Clin Hypertens (Greenwich). *2008;10:700–706.*

Excessive anger and extreme styles of expression (always keeping anger in or always letting anger out) have been associated with both elevated blood pressure and increased cardiovascular (CV) morbidity. Data for these reports are largely from studies of black and white persons.[1,2] Much less is known about the consequences of anger-in and anger-out among Mexican Americans, the fastest growing minority in the United States, which accounted for 7.3% of the total population in the 2000 census.[3] A Medline search for the term "Mexican Americans + anger" yielded 4 papers in contrast to 125 papers found when "African-Americans + anger" was the search term. These 4 papers focused on anger in schizophrenic families, discrimination, adolescents and hostility, and attitudes/beliefs about diabetes.[4–7] (The paper by Coronado and associates[7] is germane to our aims and will be discussed below.) There do not appear to be any studies examining anger, blood pressure, and CV outcomes among Mexican Americans, although many other biopsychosocial problems have been addressed in this ethnic group.

The data collected for this report will allow us to (1) examine the heritability of anger-coping types and CV variables in a sample of Mexican Americans and (2) examine anger-coping styles and their associations with CV and echocardiographic

From the Division of Cardiovascular Medicine, Department of Internal Medicine, University of Michigan, Ann Arbor, MI;[1] the Department of Psychiatry, University of California, San Diego, La Jolla, CA;[2] San Diego Veterans Affairs Healthcare System, San Diego, CA;[3] and the Department of Preventive Medicine and Epidemiology, Loyola University Chicago, Maywood, IL[4]
Address for correspondence: Lillian Gleiberman, PhD, Division of Cardiovascular Medicine, 24 Frank Lloyd Wright Drive, Ann Arbor, MI 48106-0739
E-mail: lillig@umich.edu
Manuscript received February 12, 2008; revised June 12, 2008; accepted July 8, 2008

doi: 10.1111/j.1751-7176.2008.00011.x

factors. Data for the Mexican American sample were collected by researchers from the Loyola University site of the GenNet study in Maywood, Illinois. GenNet represents 1 of the 4 major arms of the Family Blood Pressure Program, a large multicenter genetic epidemiology study of high blood pressure and related conditions in multiple racial groups supported by the National Heart, Lung, and Blood Institute.[8]

METHODS

Sample

The sample was recruited from the communities of Cicero and Berwyn, as well as the west side of Chicago. The minimum unit of recruitment per family was a sibling pair, consisting of a proband aged 12 years or older and at least one sibling. Attempts were made to recruit the sibling closest in age to the proband; parents were also included if they agreed to participate. No blood pressure criteria were used in recruitment, and ethnicity was self-described. In total, 738 self-identified Mexican Americans from 350 families were recruited. Most of the participants were immigrants or first-generation offspring, largely in working-class blue-collar jobs.

Physical Data

Systolic blood pressure (SBP), diastolic blood pressure (DBP), anthropometrics, and lifestyle data were collected for all participants; 295 participants had 2-dimensional–guided M-mode echocardiography. Blood pressure was measured by a trained and certified technician using a mercury manometer. Two measurements were taken in each individual, and the average systolic and diastolic values were used in the analyses. Left ventricular mass (LVM) was calculated by the Devereux formula[9] and corrected for height to the 2.7 power ($LVM/HT^{2.7}$), which normalizes ventricular mass for body size.[10] Use of this formula avoided problems in assessing the impact of being overweight and eliminated artifacts of indexing to body surface area.[10]

Anger-Coping Types

Participants responded to the Spielberger State-Trait Anger Expression Inventory, the most widely used instrument to examine anger-coping types. The scale was designed for individuals aged 13 and older and validated using other anger and personality measures.[11] The questionnaire is composed of 24 items from which 4 subscales are derived: anger-in, anger-out, anger-control, and total anger expression. Respondents noted whether they almost never, sometimes, often, or almost always responded in a certain manner. Examples from the anger-in subscale are "I keep things in," "I tend to harbor grudges that I don't tell anyone about"; anger-out: "I do things like slam doors," "I say nasty things" (there are no items about physical violence in this scale); anger-control: "I keep my cool," "I can stop myself from losing my temper." The score for the first 3 subscales (8 items each) was arrived at by summing the response to each of the 8 items (rated 1–4); thus, the minimum score is 8 and the maximum score is 32. The total anger expression score represents the score on anger-in plus the score on anger-out minus the score on anger-control plus 16 (thus ensuring that there are no negative scores). The scale was translated into Spanish and then retranslated back into English to be certain that the integrity of the questions was maintained. Respondents could choose to answer the Spanish version or the English version.

Statistical Analysis

We analyzed the sample in two ways. Only the proband in each family who had both echocardiographic and anger data was used in the initial analysis to avoid stratification by familial clustering. However, in this exploratory effort, we also compared the results of the probands with that of the total sample for whom we had both echocardiography and anger data.

Variance component methodology, as implemented in the SOLAR version 2.1.2 linkage analysis package (Sun Microsystems, Santa Clara, CA), was exploited to obtain heritability estimates for each of the variables using the total sample of related individuals.[12] As controlling for the effects of a known covariate is important to obtain an accurate estimate of heritability, age and sex were screened for significance as covariates for each variable and were retained in the heritability analysis of a particular variable only if a significant association ($P \leq .05$) was observed. Statistical testing was by ANCOVA, *t*-test, and Pearson partial correlations. For the covariance analysis, participants were divided into quartiles of anger-in, anger-out, anger-control, and total anger expression. Significance was accepted at $P \leq .05$.

RESULTS

Table I presents the descriptive characteristics of the probands (unrelated) and the entire sample of families for which anger information and

Table I. Descriptive Characteristics of the Samples

	Probands		Total Sample	
	No.	Mean±SD	No.	Mean±SD
Sex, % (M/F)		20/80		34/66
Age, y	88	43.0±10.2	276	39.0±15.7
Height, m	88	1.6±0.1	276	1.6±0.8
Weight, kg	88	78.0±6.5	276	76.5±2.0
Body mass index, kg/m^2	88	30.4±6.5	276	29.6±7.0
SBP, mm Hg	88	116.9±15.8	276	115.9±16.9
DBP, mm Hg	88	68.2±12.2	276	66.8±12.2
Heart rate, beats/min	88	63.9±9.8	276	63.9±9.6
LVM/HT$^{2.7}$	88	34.3±9.3	276	34.2±8.9
Stroke volume, mL/beat	88	1.8±0.2	276	1.8±0.2
Cardiac output, mL/min	88	4703.2±1001.0	276	4734.4±991.4
Ejection fraction, %	88	66.9±14.9	276	68.1±14.5
Anger-in[a]	76	15.2±3.1	205	15.0±3.3
Anger-out[a]	78	13.0±2.8	208	13.3±3.4
Anger-control[a]	77	21.7±5.0	205	21.7±5.3
Total anger expression[a]	74	22.3±7.2	199	22.7±8.7

Abbreviations: DBP, diastolic blood pressure; LVM/HT$^{2.7}$, left ventricular mass after correction for height to the 2.7 power; SBP, systolic blood pressure. [a]See Methods section for definitions.

Table II. Heritability of Echocardiographic Variables and Anger-Coping Types

				Covariate *P* Value	
	No.	h^2±SE	*P* Value	Age	Sex
Body mass index, kg/m^2	295	0.43±0.14	.0003	<.0001	.2
SBP, mm Hg	295	0.40±0.13	.0004	<.0001	<.0001
DBP, mm Hg	295	0.35±0.14	<.0001	.001	.001
Heart rate, beats/min	295	0.23±0.13	.03	.001	.8
LVM/HT$^{2.7}$	295	0.55±0.14	<.0001	<.0001	<.0001
Stroke volume, mL/beat	295	0.61±0.17	.0001	<.0001	<.0001
Cardiac output, mL/min	294	0.34±0.14	.004	.05	<.0001
LV ejection fraction, %	295	0.48±0.18	.002	.3	.0006
Anger-in[a]	711	0.22±0.08	.001	.2	.1
Anger-out[a]	710	0.15±0.08	.02	<.0001	.02
Anger-control[a]	704	0.16±0.08	.01	<.0001	.2
Total anger expression[a]	687	0.30±0.08	<.0001	<.0001	.6

Abbreviations: DBP, diastolic blood pressure; h^2, heritability; LV, left ventricular; LVM/HT$^{2.7}$, left ventricular mass after correction for height to the 2.7 power; SBP, systolic blood pressure. [a]See Methods section for definitions.

echocardiographic data were available. This is an adult sample, the majority of whom are female. In addition, this is an obese sample with no significant differences in body mass index (BMI) between males and females in both samples (probands: males, 32.5±8 kg/m^2, females, 30.0±6 kg/m^2; entire sample: males, 30.0±6 kg/m^2, females, 30.0±7 kg/m^2). The means and standard deviations for the remainder of the physical variables and the anger-coping styles were virtually identical in these two samples.

Table II presents the heritability of the echocardiographic variables and the anger-coping types, adjusted for age and sex. For this analysis, the total sample was used. Although approximately 700 individuals responded to the anger questions, only 295 underwent echocardiography. All 4 anger-coping types and all echocardiographic variables had significant heritabilities; total peripheral resistance was of borderline significance. Age and sex were significant covariates for many of the echocardiographic variables, and age

Table III. Quartiles of Anger-Out in Relation to Blood Pressure, BMI, and LVM/HT$^{2.7}$

	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile	*P* Value[a]
SBP, mm Hg	117.3±2.8	111.6±3.0	117.9±3.1	125.3±4.0	.06
DBP, mm Hg	68.9±2.2	66.4±2.4	69.5±2.5	71.4±3.2	NS
BMI, kg/m^2	29.8±1.3	27.2±1.4	32.0±1.5	33.7±1.9	.03
LVM/HT$^{2.7}$	32.9±1.7	31.0±1.8	34.5±1.9	40.0±2.4	.03

Abbreviations: BMI, body mass index; DBP, diastolic blood pressure; LVM/HT$^{2.7}$, left ventricular mass after correction for height to the 2.7 power; SBP, systolic blood pressure. Values are mean±SE and are adjusted for age and sex (N=77).
[a]By ANCOVA.

Table IV. Partial Correlations (Adjusted for Age) for Mexican American Probands and Total Sample

	Males (n=13) Probands	Males (n=60) Total Sample	Females (n=59) Probands	Females (n=141) Total Sample
SBP and LVM/HT$^{2.7}$	0.15	0.14	0.51[a]	0.48[a]
DBP and LVM/HT$^{2.7}$	0.19	0.17	0.35[b]	0.37[a]
BMI and LVM/HT$^{2.7}$	0.67[b]	0.45[b]	0.68[b]	0.51[a]
Anger-out and LVM/HT$^{2.7}$	−0.20	−0.15	0.30[c]	0.16[c]
Anger-out and SBP	0.20	0.12	0.15	0.20[c]
Anger-out and DBP	−0.14	0.22[d]	0.10	0.23[b]
Anger-out and BMI	−0.21	−0.16	0.29[c]	0.14[d]
BMI and SBP	0.40	0.23[d]	0.43[a]	0.38[a]
BMI and DBP	0.55[c]	0.23[d]	0.33[b]	0.28[b]

Abbreviations: BMI, body mass index; DBP, diastolic blood pressure; LVM/HT$^{2.7}$, left ventricular mass after correction for height to the 2.7 power; SBP, systolic blood pressure. [a]P<.001; [b]P<.01; [c]P<.05; [d]P<.10.

was a significant covariate for 3 of the anger types as well.

We then examined the intercorrelations among the 4 anger-coping types. Anger-in was significantly correlated with anger-out (r=0.35; P<.001) and with total anger expression (r=0.59; P<.001). Anger-out was significantly correlated with total anger expression (r=0.70; P<.001). Anger-control was negatively related to the 3 other anger types and was significant for total anger expression (r=−0.77; P<.001) and anger-out (r=−0.28; P<.05). We also compared the anger scores of Mexican American males and females; males had slightly higher scores on all 4 anger types, but there were no significant differences (anger-in: males vs females, 16±3 vs 15±3; anger-out: males vs females, 14±3 vs 13±4; anger-control: males vs females, 22±5 vs 21±5; total anger expression: males vs females, 23±8 vs 23±9).

After dividing the 4 anger-coping types into quartiles and adjusting for sex and age, we carried out an ANCOVA. The only anger type for which there was a significant result was anger-out (Table III). From among all the variables described in Table I, only body mass index, LVH/HT$^{2.7}$, and SBP showed relationships with anger-out (P=.03, .03, and .06, respectively), and only these variables as well as DBP were considered in the remainder of the analyses. For these 4 variables, the second quartile of anger-out had the lowest scores. LVM was also significantly associated with anger-out (F=3.5; P<.05).

We next examined these variables separately by sex, using the anger styles as quantitative linear variables. We first used the sample of unrelated probands in a series of partial correlations adjusted for age. Again, anger-out was the only anger type that manifested any significant correlations (Table IV). Males and females appeared to have different relationships for anger-out with some of the variables. For females, anger-out was significantly related to LVM/HT$^{2.7}$ and to BMI. Further, in females, LVM/HT$^{2.7}$ was significantly related to SBP and DBP. Finally, BMI was significantly related to both SBP and DBP. For males, inverse but nonsignificant relationships for anger-out with BMI, LVM/HT$^{2.7}$ and DBP were observed. Significant positive correlations were observed for males for BMI with LVM/HT$^{2.7}$ and DBP.

We then carried out the same partial correlations (adjusting for age) on the entire sample (Table IV), which included related individuals. Results for females were similar to those of the probands with stronger significance levels for all the correlations except for anger-out and BMI. For the total sample of females, BMI and anger-out were now significantly correlated with both SBP and DBP. For males, the negative relationships for anger-out and BMI and for anger-out and LVM/HT$^{2.7}$ reflect the same findings we observed with the probands; however, the negative relationship between anger-out and DBP was now positive and at a borderline level of significance. The positive and significant relationship for males between BMI with LVM/HT$^{2.7}$ and with DBP was also replicated when the entire sample was used.

DISCUSSION

This report is the first to examine the heritability of anger-coping types as well as the relationship of anger-coping types to physical and echocardiographic variables in Mexican Americans. Heritability was examined in the total sample of related individuals, and virtually all of the variables were found to be significantly heritable. The relationship of genetic factors to anger has been examined in few studies of whites and fewer still comparing blacks and whites (eg, Wang and colleagues[13] used a twin sample to measure heritability in blacks and whites). Family resemblance for anger-in, anger-out, and anger-control were demonstrated. Except for anger-control, however, it was not evident whether the familiality was due to genes or environment. To our knowledge, there have been no epidemiologic investigations of anger and heritability among Mexican Americans. It is reasonable to assume that anger has a genetic component: the emotion of anger triggers the basic mammalian fight-flight response, which is of obvious adaptive significance. Anger increases sympathetic nervous system activity manifested in part by increased blood pressure and heart rate[14]; this response evolved to prepare the body to defend against physical assault from predators and has been strongly conserved by natural selection. In present-day environments, anger is primarily aroused through interpersonal relationships, and extremes of intense anger expression or suppression of angry feelings can have adverse consequences (eg, job loss or dysfunctional family interactions). Individuals need to keep angry feelings in balance, express them to others in a calm and reflective manner, and ultimately resolve them; excessive anger, either expressed or suppressed, has been found to render both blacks and whites at risk for CV disease.[1,2]

Our other major finding was that higher anger-out scores in females were significantly related to higher LVM/HT$^{2.7}$ and BMI both for the probands and for the entire sample; males, in contrast, had negative but nonsignificant scores for these factors which remained consistent for both probands and the entire sample. The outcomes for BMI and the examined correlates were similar for both sexes. BMI was significantly related to LVM/HT$^{2.7}$ among the unrelated persons and the total sample for both sexes. For males, BMI had a borderline relationship with SBP and DBP in the total sample, although BMI and DBP were significantly related in the smaller proband sample. For females, BMI was significantly related to SBP and DBP only for the entire sample. These shifts are reasonably a reflection of the small sample size of probands. The other 3 anger-coping types did not have any significant association with any of the echocardiographic variables or anthropometric variables.

Sociocultural traditions influence how individuals handle angry feelings. Mexican Americans have a number of traditional folk medicine beliefs. A substantial proportion of this cultural group believe that anger (*coraje* in Spanish) and fear or frightful experiences (*susto* in Spanish) can cause diabetes. For example, one person interviewed in Yakima County, California, expressed herself in this manner: "I felt very hungry and had a lot of *coraje* . . . my husband was an alcoholic and I was always alone and this gave me much *coraje*. I took care of my children, feeling my mouth really dry, and very hungry, and *coraje*. I went to the doctor, who gave me a checkup and told me that I had diabetes . . ."[7] More detailed information comes for the most part from communities in Mexico; whether these beliefs and their consequences can be applied to Mexican Americans is uncertain but appears reasonable.

Similar beliefs are found in other Mexican communities. The Mexicans of Kumiai in Baja California believe that anger or rage can be a cause of high blood pressure.[15] Mexicans from Oaxaca consider anger a cause of illness, such as heart disease and diabetes.[16] The illness depends upon where in the body the anger falls (ie, is experienced). Some village women wear belts under their dresses; they believe that the practice keeps the anger in the stomach area and prevents it from traveling to a person's heart, where it can cause death. In addition, some believe that anger can be transmitted from person to person and result in disease.[16]

Because of these fears, daily frustrations may often not be expressed or resolved. Among Mexicans who have emigrated to the United States, such traditional beliefs may persist and be a factor in uniting and supporting the community in a new and nonwelcoming culture.

The finding that among women, anger-out was associated with higher LVM/HT$^{2.7}$ seems reasonable. Mexican American women may feel that suppressing anger is more appropriate and may feel guilty if feelings are outwardly manifested. Women in Mexico are more susceptible than men to experiencing anger as a somatic experience (eg, described as headache or diarrhea).[16] Perhaps the taboo against expressing anger and the fear that its contagion will harm someone is strong enough to alter physiologic pathways that can lead to negative CV consequences; clearly, the outward expression of some degree of anger is inevitable and may cause guilt and distress. To our knowledge, the only other finding relating anger and LVM was our earlier observation that high anger-in was related to higher LVM in white females in Tecumseh, Michigan.[17]

The negative association of males' high scores of anger-out with BMI and LVM/HT$^{2.7}$ may be understood from the sex differences in behavior that serve as norms in Mexican societies and that may persist in Mexican Americans. Men may go out in the evening to a canteen and drink alcohol with their companions to dissipate their emotional strains[18]; domestic violence is common among men, although less so in Mexican Americans born in Mexico than in the United States.[19] On the other hand, the small sample size of the male cohort would suggest less confidence in these results and speculations.

Both excessive expression and suppression of anger have been shown to be associated with elevated blood pressure and CV morbidity in blacks and whites,[1,2] but the relationships have not been studied in Mexican Americans. High blood pressure and left ventricular hypertrophy are conditions without symptoms; the prevalence of essential hypertension among Mexican Americans is similar to or less than white Americans[20,21] and thus may be of less interest to researchers examining emotional attitudes and disease within specific ethnic groups.

CONCLUSIONS

This is the first report in Mexican Americans to demonstrate heritability of anger types and to show that anger-out is related in females to LVM/HT$^{2.7}$ and BMI (both of which have a significant heritable component). One limitation of this paper is the small sample size, particularly for the male probands; future studies should address this problem. The findings for females also need to be replicated before further hypotheses about anger and CV factors are examined in Mexican American samples. Cultural attitudes toward anger that are specific to Mexicans (and reasonably to Mexican Americans) recommend further investigation of the qualitative nature of the anger experience within acculturated communities in the United States. Mexican Americans represent a distinct subset (58%)[22] of Hispanics that is continually growing. Like all minorities, this population is subject to a variety of prejudices and stresses in the workplace and in social relations; anger is surely increased in those Mexican Americans who must deal with the problems of being illegal immigrants. Physicians treating Mexican Americans should become conversant with ethnic traditions and beliefs about emotions and disease to communicate better and to encourage compliance with treatment.

Acknowledgment: This work was supported by grant #HL54512 from the National Heart, Lung, and Blood Institute as part of the Family Blood Pressure Program.

REFERENCES

1 Williams JE, Nieto FJ, Sanford CP, et al. Effects of an angry temperament on coronary heart disease risk: the Atherosclerosis Risk in Communities Study. *Am J Epidemiol.* 2001;154:230–235.

2 Harburg E, Gleiberman L, Russell M, et al. Anger-coping styles and blood pressure in black and white males: Buffalo, New York. *Psychosom Med.* 1991;53(2): 153–164.

3 *Profiles of General Demographic Characteristics: 2000 Census of Populations and Housing United States*. http://www.census.gov/main/www/cen2000.html. Accessed August 18, 2008.

4 Gee GC, Ryan A, Laflamme DJ, et al. Self-reported discrimination and mental health status among African descendants, Mexican Americans, and other Latinos in the New Hampshire REACH 2010 initiative: the added dimension of immigration. *Am J Public Health.* 2006; 96(10):1821–1828.

5 Liehr P, Meininger JC, Mueller WH, et al. Psychometric testing of the adolescent version of the Cook-Medley hostility scale. *Issues Compr Pediatr Nurs.* 2000;23(2): 103–116.

6 Weisman A, López SR, Karno M, et al. An attributional analysis of expressed emotion in Mexican-Americans families with schizophrenia. *J Abnorm Psychol.* 1993;102(4): 601–606.

7 Coronado GD, Thompson B, Tejeda S, et al. Attitudes and beliefs among Mexican Americans about type 2 diabetes. *J Health Care Poor Underserved.* 2004;15(4): 576–588.

8 Thiel BA, Chakravarti A, Cooper RS, et al. A genome wide linkage analysis investigating the determinants of blood pressure in whites and African Americans. *Am J Hypertens.* 2003;16:151–153.

9 Devereux RB, Alonso DR, Lutas EM, et al. Echocardiographic assessment of left ventricular hypertrophy: comparison to necropsy findings. *Am J Cardiol.* 1986;57: 450–458.

10 De Simone G, Devereux RB, Daniels SR, et al. Effect of growth on variability of left ventricular mass: assessment of allometric signals in adults and children and their capacity to predict cardiovascular risk. *J Am Coll Cardiol.* 1995;25:1056–1062.

11 Spielberger CD. *State-Trait Anger Expression Inventory. Professional Manual Center for Research in Behavioral Medicine and Health Psychology*. Odessa, FL: Psychological Assessment Resources, Inc; 1991.

12 Almasy L, Blangero J. Multipoint quantitative-trait linkage analysis in general pedigrees. *Am J Hum Genet.* 1998;62:1198–1211.

13 Wang X, Trivedi R, Treiber F, et al. Genetic and environmental influences on anger expression, John Henryism, and stressful life events: the Georgia Cardiovascular Twin Study. *Psychosom Med.* 2005;67:16–23.

14 Cannon W. *Bodily Changes in Pain, Hunger, Fear, and Rage*. New York, NY: Appleton; 1929.

15 Fleuriet KJ. Health and health care problems among the Kumiai of San Antonio Necua and their indigenous relatives in Baja California: Reflections of poverty, marginality, and a history of colonization. *Calif J of Health Promotion.* 2003;1(1):140–157.

16 Bender E. Culture-bound mental illness affects many Mexicans. *Psychiatr News.* 2003;38(1):17–19.

17 Gleiberman L, Delgado MC, Sen S, et al. Higher anger-in scores are associated with increased left ventricular mass index. *Am J Hypertens.* 2004;17:S197.

18 Finkler K. *Spiritualist Healers in Mexico: Successes and Failures of Alternative Therapeutics*. New York, NY: Bergin & Garvey Publishers, Inc; 1985.

19 Sugihara Y, Warner JA. Dominance and domestic abuse among Mexican Americans: gender differences in the etiology of violence in intimate relationships. *J Fam Violence.* 2002;17(4):315–340.

20 Kountz DS. Hypertension in ethnic populations: tailoring treatments. *Clin Cornerstone.* 2004;6(3):39–48.

21 Samet JM, Coultas DB, Howard CA, et al. Diabetes, gallbladder disease, obesity, and hypertension among Hispanics in New Mexico. *Am J Epidemiol.* 1988;128(6):1302–1311.

22 Lin SX, Pi-Sunyer EX. Prevalence of the metabolic syndrome among US middle-aged and older adults with and without diabetes: a preliminary analysis of the NHANES 1999–2002 data. *Ethn Dis.* 2007;17(1):35–39.