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Age-related differences in biomedical and folk beliefs as causes for diabetes and heart disease among Mexican origin adults

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INTRODUCTION

Traditional folk illness beliefs are important to lay theories of disease causation among many Hispanic populations (1, 2). Recent studies have provided a range of perspectives on the cultural significance of folk illness beliefs among Mexican origin groups such as individuals' knowledge and experiences with folk illnesses, the interface between folk illness beliefs and utilization of biomedical health services and folk illnesses as part of explanatory models for common chronic diseases (3–9).

Health beliefs may vary considerably within Mexican origin groups in transition depending on personal experiences with disease, level of acculturation, age, or nativity and also the extent to which more traditional folk illness beliefs are transferred from one generation to the next. Gaining insight into the complexity of health beliefs among Mexican origin groups in the U.S. is important to developing culturally appropriate health services.

In the U.S. *susto* ("fright") and *nervios* ("nerves," "anxiety") have been reported as important concepts in lay explanatory models of diabetes, and to a lesser degree cardiovascular disease, among Mexican origin groups (1–2, 5–9). However, the significance of these and other folk illness beliefs have not been evaluated in our Houston cohort of Mexican origin adults. For the present study, we wanted to explore how important these and other folk illness beliefs were in explaining diabetes and heart disease, which are two diseases of public health importance among people of Mexican origin. To this end we examined the coexistence of causal beliefs derived from traditional folk illness and Western biomedical paradigms. Two key research questions guide the inquiry: to what extent do folk illness and Western biomedical beliefs coexist, and to what extent should folk illness beliefs be integrated into health interventions? We focus on age-based variations in beliefs about the importance of potential risk factors for developing heart disease and diabetes because such differences potentially reflect different levels of acculturation, experiences, and knowledge.

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METHODS

Participants

The Risk Assessment for Mexican Americans (RAMA) Study is designed to investigate how family members gather and disseminate information about their family health history. Households for the RAMA study were identified from within the Mexican American Cohort Study (MACS). Detailed descriptions of the recruitment methodology for both RAMA and the larger MACS have been described elsewhere (10,11). Briefly, on recruitment into the MACS participants completed a baseline survey, which included a full enumeration of all individuals residing in their home. Multigenerational households with at least three adult members, two of whom are blood relatives and two of whom have a social tie (i.e. married or living as married) were eligible to participate in the RAMA study.

Once a household agreed to participate in the RAMA Study, a home visit was scheduled. For the home visit, two trained bilingual interviewers obtained written informed consent from all participating adults. Each participant was given a laptop computer and asked to complete the electronic baseline survey. Participants could elect to take the survey in either Spanish or English. Interviewers assisted participants as requested.

A total of 1,715 MACS households were eligible for the RAMA study. Of the eligible households contacted, 162 households (i.e. 497 Mexican origin adults between 18 and 70 years of age) agreed to participate. Of the remaining potentially eligible households just over half (N=907) did not meet the eligibility criteria, 185 eligible households chose not to participate, and 461 eligible households were not contacted because recruitment goals were met.

Measures

Demographic characteristics included self-reported age, gender, country of birth, parent's country of birth, educational attainment, country where highest level of education was completed, language used to complete the survey, country in which the participant lived the longest, and type of health insurance.

In the survey participants were asked "how important do you think (risk factor) is as a cause of (disease)?" The two diseases in question were heart disease and diabetes. Participants were presented with seven widely-accepted risk factors drawn from the biomedical literature (age, alcohol use, tobacco use, diet, lack of physical activity, genes, and stress) and six folk illness concepts as risk factors [fate, *embrujo* "witchcraft"), *empacho* ("intestinal/bowel obstruction"); *susto* "fright"); *nervios* ("nerves"); *mal de ojo* ("evil eye")]. These particular folk illness items were drawn from the Folk Illness Beliefs scale of the Acculturation Rating Scale for Mexican Americans-II (12). Response options ranged from "not important (1" to "very important (4)."

Analysis

Quartiles were computed for participants' age in order to construct age groups for the primary analyses. Descriptive statistics were calculated for each age quartile. Significant differences in sample characteristics across age quartiles were evaluated using logistic regression for binary characteristics and ordinal regression for the multi-category characteristics. Analysis of covariance (ANCOVA) was used for the primary analyses examining differences in causal beliefs for heart disease and diabetes across age quartiles. Covariates of the causal belief models included respondent gender and survey language used at assessment. All statistical inferences used generalized estimating equations, with an

exchangeable covariance matrix, to control for the clustering of participants within households. SPSS 17.0 was used to complete all statistical analyses (13).

RESULTS

After controlling for clustering within the family, the distribution of participant socio-demographic characteristics varied in all categories other than country of parents' birth by age group (Table I). A higher proportion of participants ages 18–41 years were female compared to participants ages 42–75 years. While fewer than 40% of participants in the youngest group were born in Mexico, over 70% of participants in the other three age groups were born in Mexico. A similar pattern was observed for length of time participants have resided in Mexico relative to the US, country in which the participants completed their formal education, and language in which participants took the survey. Participants in the youngest age group reported higher levels of educational attainment than participants in the other three age groups. Fewer than 60% of participants ages 25–51 years had health insurance, whereas 69% in the youngest age group and 76% in the oldest age group had health insurance.

There was little difference between how participants ranked the causes of heart disease by age group: the biomedical causes were ranked higher than the folk illness beliefs (Table II). The behavioral risk factors diet and exercise were ranked as the two most important factors leading to heart disease among all age groups. Genetic contributions were ranked higher than folk illnesses. Regardless of age group the folk illness beliefs, including *nervios, susto, empacho, embrujo, mal de ojo* and fate, were consistently ranked as the least important causes of heart disease.

After adjusting for gender, language and household clustering, the mean scores for the importance of diet and lack of exercise as causes of heart disease were significantly higher among participants over 42 years of age compared to those 41 years of age or younger ($p<0.01$ for all). In addition, the adjusted mean scores for both stress and genes as causes of heart disease were significantly higher among participants over 25 years of age than among those under 25 years of age ($p<0.01$ for all). Although consistently ranked sixth, the adjusted mean score for alcohol as a cause of heart disease was significantly higher among participants over 25 years of age than among those under age 25 ($p<0.01$ for all).

Overall there was more variation in the rank order of important risk factors as causes of diabetes by age group compared to heart disease (Table III). Again, diet and lack of physical activity were consistently ranked in the top three contributors to diabetes, regardless of age. Genes were also one of the top three contributors to diabetes. There appeared to be a trend for older participants to rank *susto* higher than younger participants. Similar to heart disease, regardless of age group *empacho, embrujo, mal de ojo* and fate were all consistently ranked as the least important causes of diabetes.

After adjusting for gender, language in which the survey was completed and family clustering, the mean score for alcohol as a cause of diabetes was significantly higher among participants over 25 years of age than among those under age 25 ($p<0.01$ for all). In addition, the adjusted mean score for lack of exercise, genes and stress as causes of diabetes were significantly higher among participants over 42 years of age than among those under 41 years of age ($p<0.01$ for all). Finally, the adjusted mean for *susto* as a cause of diabetes increased with age group ($p<0.001$).

DISCUSSION

Literature on the significance of folk illness beliefs among Mexican origin populations demonstrates the resilience of cultural knowledge in various contexts of social transition, immigration, and acculturation (6, 7). Our exploratory study contributes to this literature by examining age-related differences in the perceived importance of several risk factors, which are drawn from two culturally distinct medical paradigms, in the onset of heart disease and diabetes. It departs from qualitative reports of folk illness beliefs among Mexican origin groups by quantitatively assessing the integration of Western biomedical and traditional Mexican folk illness beliefs and evaluating age dependent intra-cultural variation.

Variation observed in health beliefs by age potentially reflects different levels of acculturation. If being born in the U.S., educated and residing longest in the U.S. and indicating an English language preference are considered proxies of acculturation to the U.S., one could conclude that the acculturation level of participants in the youngest age group is quite high. The acculturation experiences of older participants may be unique from those who are younger; such experiences may have an impact on how participants in different age groups value different types of knowledge.

Our study participants consistently ranked biomedical factors higher than folk illness beliefs as important causes of diabetes and heart disease. While, *susto* and *nervios* have been linked to beliefs about the causation of diabetes and heart disease among other Mexican origin groups, *susto* was the only folk illness belief that was important among our study participants, but only in relation to diabetes and only among older participants. It is possible that this age-based difference in beliefs about the importance of *susto* in diabetes causation reflects a shift towards greater acceptance of biomedical knowledge among the younger participants. Older adults (older than 25 years) who assigned a higher ranking to *susto* as a causal belief for diabetes were most likely to have been born and educated in Mexico, and to have spent more time in Mexico, where this folk illness belief is culturally salient and has been linked to explanatory models of diabetes and heart disease (14). Likewise the low ranking of folk illness beliefs among participants in younger age groupings might suggest that perhaps these beliefs may not be passed down from older to younger generations. However it is also possible that it reflects a cohort effect – as the younger participants grow older, they also may rank *susto* above age and tobacco as a cause of diabetes, particularly if *susto* is culturally defined as an illness that is more likely to affect the health of older persons. Further research is needed to better understand the reasons that older adults in this cohort tend to rank *susto* as an important cause of diabetes.

Other folk illness beliefs considered in this report (*empacho, embrujo, mal de ojo* and fate) were not important among our study participants, regardless of age, as possible factors related *specifically* to the causation of diabetes and heart disease. Whether or not these beliefs would be considered more important in the causation for other diseases, perhaps for childhood illnesses, mental health disorders, or gastrointestinal disorders, requires further inquiry.

Older adults in this population may benefit from diabetes interventions that take into account cultural beliefs about *susto* and its psychological correlates, such as chronic stress, depression, and anxiety (9). Mexican origin adults in the U.S. generally have a considerably higher rate of co-morbid depression and diabetes, and the health consequences of diabetes and heart disease are exacerbated by depression in older individuals (9, 15–16). Health interventions that attend to both the physiological and psychological dimensions of these chronic diseases among older adults in our study population may be important. For instance, assessing the life experiences associated with *susto* during evaluations of diabetes treatment

options may be one way that health care providers can create more holistic and culturally sensitive services.

Study participants did not rank *nervios* as an important cause of either diabetes or heart disease, which contrasts with reports of explanatory models in other Mexican origin groups (2, 8–9). This difference reiterates the importance of variation in the salience of folk illness beliefs among Mexican origin groups depending on where they are living in the U.S. Culturally appropriate health interventions should be tailored to meet the needs of each population and the unique context of their acculturation.

It is interesting that the adjusted mean score for genes as a cause of heart disease was higher among those over the age of 25, and then for diabetes, the adjusted mean score for genes as an important cause was significantly higher among those over age 42. Because a genetic predisposition to chronic diseases is reflected in the medical histories of family members, these findings may indicate that older participants are better informed about their family's health history and are more aware of potential hereditary disease patterns than younger family members (17). Health interventions to increase knowledge of family health history among younger adults may be valuable, particularly since this information is needed for accurate clinical risk assessments of heart disease and diabetes and prescribing actions for prevention. Providing health education that raises awareness of the importance of family history in heart disease and diabetes susceptibility may help to motivate those at risk to engage in appropriate screening behaviors.

As with all studies, ours had some limitations. This study was cross-sectional and so change in participants' belief systems are not captured. While the participants were born in either Mexico or the U.S., currently all participants reside in Houston, Texas, which may limit the generalizability of our results (14). Also, we are unable to describe the behavioral implications of participants' causal beliefs. Research that explores how age differences and causal beliefs may translate into differences in health behaviors may be particularly important to the design of preventive interventions. More qualitative research is needed on change in health belief systems that focuses specifically on intergenerational differences in acculturation experiences.

CONCLUSION

Because of different levels of acculturation within migrant populations, interventions that provide health education and promote healthy behaviors should account for the cultural beliefs of the groups they are targeting. This exploratory analysis of age-related differences in causal beliefs for diabetes and heart disease elucidates the intra-cultural diversity of health belief systems among Mexican origin adults in Houston. The findings suggest important differences in explanatory models for disease that are associated with levels of acculturation to the U.S. These differences may provide insight into how to tailor the provision of clinical care, health education, and public health interventions.

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Table I

Socio-demographic characteristics of participants by age group

Characteristic	p-value	18–24 years (N=121)		25–41 years (N=113)		42–51 years (N=124)		52–75 years (N=139)	
		N	(%)	N	(%)	N	(%)	N	(%)
Gender	0.001								
Female		74	(61.2)	67	(59.3)	63	(50.8)*	68	(48.9)**
Country of birth	< 0.001								
Mexico		46	(38.0)	80	(70.8)***	105	(84.7)***	109	(78.4)***
Lived in Mexico longer than US	< 0.001								
Yes		15	(12.4)	46	(40.7)***	35	(28.2)***	29	(20.9)**
No. parents born in Mexico	n/s								
None		5	(4.1)	8	(7.1)	9	(7.3)	10	(7.2)
One		16	(13.2)	7	(6.2)	8	(6.5)	20	(14.4)
Both		91	(75.2)	94	(83.1)	100	(80.6)	101	(72.7)
Missing		9	(7.4)	4	(3.5)	7	(5.6)	8	(5.7)
Educational Attainment	< 0.001								
< high school		31	(25.6)	60	(53.1)***	87	(70.2)***	103	(74.1)***
HS grad or GED		48	(39.7)	21	(18.6)***	20	(16.1)***	12	(8.6)***
> high school		42	(34.7)	32	(28.3)	17	(13.7)***	21	(15.1)***
Missing		0	(0.0)	0	(0.0)	0	(0.0)	3	(2.2)
Country of education	< 0.001								
Mexico		4	(3.3)	61	(54.0)***	91	(73.4)***	91	(65.5)***
Survey language	< 0.001								
Spanish		29	(24.0)	73	(64.6)***	108	(87.1)***	109	(78.4)***
Health Insurance	0.004								
Yes		83	(68.6)	62	(54.9)**	70	(56.5)	105	(75.6)

*
p < .05;

**
p < .01;

***
p<.001

Table II

Mean and rank order of biomedical and folk illness as a cause of heart disease, adjusted for gender, language, and household clustering

		18–24 years (N=121)		25–41 years (N=113)		42–51 years (N=124)		52–75 years (N=139)	
Cause of Heart Disease	**p-value**	**Mean**	**Rank**	**Mean**	**Rank**	**Mean**	**Rank**	**Mean**	**Rank**
Age	n/s	2.67	7	2.91	7	2.72	9	2.73	9
Alcohol	<0.05	2.86	6	3.21**	6	3.18**	6	3.08	6
Diet	<0.05	3.41	2	3.55	2	3.69**	2	3.68**	2
Lack of exercise	<0.001	3.47	1	3.66	1	3.81***	1	3.78***	1
Fate	n/s	1.88	10	1.88	10	1.89	10	1.89	10
Genes	<0.001	3.07	5	3.40**	5	3.54***	4	3.40**	4
Stress	<0.001	3.14	4	3.50***	3	3.56***	3	3.52***	3
Tobacco	<0.05	3.19	3	3.42	4	3.52**	5	3.40	4
Embrujo	n/s	1.55	11	1.45	11	1.39	12	1.55	12
Empacho	<0.01	1.25	13	1.22	13	1.43	11	1.56**	11
Mal de ojo	n/s	1.27	12	1.31	12	1.33	13	1.43	13
Nervios	n/s	2.29	8	2.81	8	2.94	7	2.92	7
Susto	n/s	2.08	9	2.60	9	2.83	8	2.84	8

Note: Significance in aged group specific columns denotes pairwise significance compared to the referent (young group).

** p<.01;

*** p<.001

Table III

Mean and rank order of biomedical and folk illness as a cause of diabetes, adjusted for gender, language, and household clustering

		18–24 years (N=121)		25–41 years (N=113)		42–51 years (N=124)		52–75 years (N=139)	
Cause of Diabetes	**p-value**	**Mean**	**Rank**	**Mean**	**Rank**	**Mean**	**Rank**	**Mean**	**Rank**
Age	n/s	2.35	6	2.66	6	2.62	9	2.58	9
Alcohol	<0.001	2.61	5	2.92**	5	3.25***	5	2.99**	5
Diet	<0.05	3.55	1	3.54	1	3.73	1	3.75	1
Lack of exercise	<0.001	3.36	2	3.46	3	3.71***	2	3.67**	2
Fate	n/s	1.81	9	1.77	10	1.84	10	1.78	10
Genes	<0.01	3.21	3	3.47	2	3.55***	3	3.46**	3
Stress	<0.001	2.83	4	3.13	4	3.38***	4	3.38***	4
Tobacco	<0.05	2.22	7	2.56	7	2.63	8	2.77	7
Embrujo	n/s	1.47	11	1.31	11	1.38	12	1.53	12
Empacho	<0.01	1.36	12	1.28	12	1.41	11	1.57	11
Mal de ojo	n/s	1.21	13	1.23	13	1.30	13	1.44	13
Nervios	n/s	2.20	8	2.44	9	2.80	7	2.73	8
Susto	<0.001	1.79	10	2.51**	8	2.81**	6	2.83***	6

Note: Significance in aged group specific columns denotes pairwise significance compared to the referent (young group).

** p<.01;

*** p<.001