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Motivation for Health Screening: Evaluation of Social Influence Among Mexican-American Adults

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Abstract

Background: Americans of Mexican origin are at high risk for developing cardiovascular disease.

Purpose: To evaluate the associations between the presence of social network members who encourage screening and individuals' motivation to undergo three types of health screening: blood cholesterol, blood pressure, and blood glucose. The distinct roles of encouragers from different generations (older, same, and younger) were evaluated.

Methods: Adults of Mexican origin ($N = 452$) aged 20–75 years from 162 households in Houston, TX were included in this cross-sectional study by completing surveys in 2008 regarding their intentions to screen, health behaviors, illness beliefs, social networks, and family health history in either English or Spanish. Data were analyzed in 2009.

Results: About one third of the participants reported having at least one same-generation network member who encouraged screening; smaller proportions reported having at least one older- (17% to 19%) and one younger-generation (11% to 12%) encourager. The presence of at least one older-generation encourager was associated with higher levels of intention to screen for all three screenings controlling for sociodemographic characteristics and illness beliefs. Having at least one same-generation encourager was associated with higher levels of intention to screen for blood cholesterol.

Conclusions: Social influence may play an important role in motivating individuals to engage in screenings. Network-based intervention involving older individuals to provide encouragement to younger network members should be explored as a means to increase motivation to screen among this population

Introduction

Heart disease is the leading cause of death in the U.S.¹ High levels of low-density lipoprotein (LDL), high blood pressure, and diabetes mellitus are major modifiable risk factors of heart disease.² It is estimated that less than half of those who could benefit from treatments to lower blood cholesterol levels receive the medical care.³ In addition, 21% of those with high blood pressure⁴ and 30% of those affected by diabetes⁵ are estimated to be unaware of their

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conditions. Thus, the CDC's Heart Disease and Stroke Prevention task force has identified the detection of these risk factors through screening programs as a national priority.⁶

The Hispanic population is the most rapidly growing segment in the U.S., making up 15% of the total population in 2008 with estimated increase to 30% by 2050.⁷ Over half (67%) of the Hispanic population in 2007 were of Mexican origin.⁷ Mexican Americans have the highest prevalence of *metabolic syndrome*, “a clustering of specific cardiovascular disease risk factors.”⁸ About 32% of Mexican Americans are diagnosed with metabolic syndrome as compared to 24% of whites and 22% of African Americans,⁹ placing them at higher risk for developing and dying from heart disease.¹⁰ It is estimated that 32% of Mexican-American men and 34% of women have cardiovascular disease,¹¹ and Mexican Americans are significantly less likely to be aware of their hypertension compared to non-Hispanic blacks.⁴ Hispanics are also twice as likely to have diabetes (9.8%) than non-Hispanic whites (5.0%),¹² and the prevalence is expected to increase significantly from 2005 to 2050 (127% for Hispanics and 99% for non-Hispanic whites).¹³ In addition, Hispanics had the lowest prevalence of blood cholesterol screening in 2003.¹⁴ These reports underscore the public health benefits of seeking strategies to facilitate the detection and management of these risk factors among Mexican origin adults.

Social interactions can affect individuals' health behaviors.¹⁵ Social influence might occur *indirectly* when an individual internalizes social norms and tries to conform with them, or *directly* when social network members persuade others to engage in certain behaviors.¹⁶ Being married,^{17,18} being a parent,^{19,20} or living with family²¹ have been shown to be associated with better health behaviors. The role of social norms on health-related behaviors has also been documented.^{22,23} However, direct rather than indirect social control may be more effective in promoting health-enhancing behaviors.²⁴ For instance, an intervention to increase direct persuasion within parent-child dyads was effective in reducing the number of health compromising behaviors among adolescents.²⁵ Similarly, encouragement from physicians was associated with mammography screening²⁶ and encouragement through health education telephone calls was associated with an increase in intentions to screen for colon cancer.²⁷

Close social relationships are thought to be especially important for Mexican Americans because of the cultural value that emphasizes the importance of family (*familismo*),²⁸ and the importance of dignity and respect toward older generations (*respeto*).²⁹ Thus, network-based interventions utilizing intergenerational interactions to promote health-enhancing behaviors may be particularly beneficial to adults of Mexican origin. In fact, direct encouragement among intergenerational family members was shown to influence cancer screening practices among Latino women.^{30,31}

Intention to screen has consistently been the most important predictor of participation in blood pressure screening,³² underscoring the importance of investigating the factors associated with screening intentions to inform interventions.³² Such health beliefs as perceived susceptibility to³³ and perceived severity of the disease³² were found to be associated with intentions to screen for heart disease. Moreover, the perception of genetics as a cause of disease may reduce individuals' motivation to engage in health promoting behaviors as it is associated with lower perceived preventability, potentially due to individuals discounting the role of behaviors in disease development³⁴ or adopting a fatalistic view.³⁵ Thus, such health-related beliefs should be considered when investigating additional factors associated with screening intentions. Other factors found to be associated with screening intentions include previous screening behavior,^{26,27} cultural factors such as difficulty to speak English,³⁶ family health history,^{37,38} access to screening, and presence of a usual source of care.³⁹

The current report evaluates the hypothesis that motivations to screen are positively associated with the presence of social network members (family and friends) who provide social influence (i.e., encouragement to screen, among adults of Mexican origin). The distinct roles of encouragers from different generations (older, same, and younger) over and above the influence of cognitive factors are evaluated. Further, some demographic characteristics of the screening encouragers are evaluated to inform future practices targeting social network systems.

Methods

Participants

A total of 497 Mexican origin adults aged 18-70 years from 162 households in Houston, TX participated in a longitudinal study, RAMA (Risk Assessment for Mexican Americans), that investigates the role of family systems in gathering and disseminating family health information. Participants were recruited from the Mano a Mano Cohort, a population infrastructure developed and maintained by the Department of Epidemiology at University of Texas, MD Anderson Cancer Center.⁴⁰ In 2008, participants completed baseline surveys regarding family health history, health-related behaviors and cognitions, and their social networks in either English or Spanish. Survey instruments were translated by a certified translator at MD Anderson using forward translation from English into Spanish. A second translator proof read the original translation, and returned the document to the original translator who entered changes as needed. An advisory committee consisting of members from the community reviewed the translation and, when the translation did not match colloquial Mexican Spanish, recommended changes. Households with at least three adult members who agreed to participate were eligible. Currently, adults aged ≥ 20 years are recommended to undergo blood pressure screening every 2 years and blood cholesterol screening every 5 years. 3-41-42 Blood glucose testing is recommended for those aged ≥ 20 years identified at increased risk (e.g., overweight, lack of physical activity, first-degree relative with condition).⁴¹ Because these screening guidelines are less pertinent to individuals aged < 20 years, baseline information from 452 individuals aged ≥ 20 years was included in this current report.

Measures

Intentions to screen—Motivation to screen was measured by asking “how likely are you to have your [blood cholesterol/blood pressure/blood sugar] checked within the next year?” with response options: “definitely will not get tested (1),” “probably will not get tested (2),” “probably will get tested (3),” and “definitely will get tested (4).”

Encouragement to screen—Participants' social network members were enumerated by asking them to list “friends and family who have played a significant role in your life during the past year.” The number of enumerated individuals yielded participants' social network size. Among these network members, participants selected members who encourage them to get [blood cholesterol/blood pressure/blood sugar] screenings. Three variables were created for each of the three screenings (a total of 9 variables) to indicate whether each participant had at least one (1) older-, (2) same-, and (3) younger-generation social network member who encourages them to screen.

Past screening behavior—Participants were asked “have you had your [blood cholesterol/blood pressure/blood sugar] checked by a health professional?” after defining each screening. The 6 response categories ranged from never to yes—within the past year. Responses were recoded to indicate whether the participant had participated in each of the screenings within the past 2 years.

Illness beliefs—Four items were adapted to measure *risk perception*.⁴³ Two items asked about participants' lifetime risk ("how likely are you to get [heart disease/diabetes] in your lifetime?": "not likely (1)" to "definitely (4)"). Two additional items asked about comparative risk (same question but preceded by "compared to other people of the same sex, age, and race,": "much less likely (1)" to "extremely likely (5)"). Responses to the two questions (lifetime and comparative) were standardized then averaged across the two disease (heart disease and diabetes) to obtain an overall score, a method used in previous research.⁴⁴ *Perceived controllability* was also adapted⁴⁵ and asked "how much control do you feel that you have in preventing [heart disease/diabetes]?": "no control (1)" to "total control (4)." An average was calculated to obtain an overall measure. *Causal beliefs* measures⁴⁶ asked "how important do you think [genes, diet, exercise] are/is as a cause of [heart disease/diabetes]?": "not important (1)" to "very important (4)." Responses to two genetic contributions items (heart disease and diabetes) were averaged to obtain a *genetic causal belief* and four items regarding diet and exercise were averaged to create a *lifestyle causal belief* measure.

Participant characteristics—Participant characteristics including age, gender, levels of education, place of education, country of birth, insurance status, and language used in this study were obtained through self-report. Due to high correlations observed among the cultural factors (i.e., language used to complete survey, country in which formal education was finished, and country of birth), place of birth was used as a proxy for acculturation. Indicator variables were created for female, high school diploma or more education, born in U.S., and have health insurance.

Personal and Family Health History—Participants' *personal health history* was obtained by asking whether participants had ever been diagnosed with heart disease, high blood pressure, high cholesterol, and diabetes. The number of diagnoses was summed for each participant. In addition, the Family Healthware™ tool developed by the CDC⁴⁷ was used to obtain information on the number of biological family members who had been diagnosed with heart disease and diabetes, age at diagnosis, and whether the family member was a first- or second-degree relative. Using the algorithm for this tool,⁴⁸ family health risk levels were determined for heart disease and diabetes: low risk (0), moderate risk (1), and strong risk (2), and the average (heart disease and diabetes) was taken to obtain an overall *family health risk level* for each participant.

Analysis

Three hierarchic linear regression models were built (blood cholesterol, blood pressure, blood sugar) to evaluate the role of the presence of screening encouragers. This method accounts for the clustered nature of the data (i.e., multiple participants from the same household).⁴⁹ Potential confounding factors including participant characteristics, personal and family health history, past screening behaviors, and illness beliefs were entered first. The role of social influence was evaluated while controlling for these factors and by entering three encouragement variables: the presence of an older-, same-, and younger-generation encourager for the respective screening type. Only encouragement variables that were significant based on the results of Wald statistics at a Type I error rate of 0.05 were retained in the final model. The analyses were conducted using HLM 6.0650 in 2009. Descriptive statistics were constructed using SPSS 17.0.

Results

Participant characteristics are shown in Table 1. Sixty percent of the participants had not completed high school, 16% had a high school diploma or GED, 20% had technical/vocational training, an associate degree or some college, and 4% had completed college or earned a

postgraduate degree. In terms of *family health risk level*, 24% and 33% of the participants were identified to be at “high risk” for heart disease and diabetes respectively. On average, participants reported their level of intention to screen as “probably will get tested” or “definitely will get tested,” with average intention scores ranging from 3.34 to 3.37. There was a wide range in the reported levels, ranging between 1 and 4, indicating that some participants had very low levels of intention to screen. Approximately 11% to 12% of the participants reported having at least one younger-generation encourager whereas 29% to 31% reported having one or more same-generation and 17% to 19% reported at least one older-generation encourager.

The final models predicting the levels of intention to screen for blood cholesterol, blood pressure, and blood sugar are presented in Table 2. Having at least one older-generation encourager was significantly associated with higher levels of intention for all screening types: blood cholesterol ($\beta = 0.18, p = 0.03$), blood pressure ($\beta = 0.22, p < 0.01$), and blood sugar ($\beta = 0.24, p < 0.01$). Having at least one same-generation encourager was significantly associated with higher levels of intention to screen for blood cholesterol ($\beta = 0.19, p < 0.01$). The presence of a younger-generation encourager was not associated with screening intentions. In addition, higher levels of perceived risk were associated with higher levels of intention to participate in blood pressure ($\beta = 0.11, p = 0.02$) and blood sugar screenings ($\beta = 0.12, p < 0.01$). Higher levels of lifestyle causal beliefs were associated with higher levels of intention to screen for blood cholesterol ($\beta = 0.17, p = 0.04$) and blood pressure ($\beta = 0.16, p = 0.01$), whereas higher levels of genetic causal belief were associated with higher levels of intention to screen for blood sugar ($\beta = 0.10, p = 0.03$).

A total of 6,353 social network members (1,284 *younger-*, 2,598 *same-*, and 2,471 *older-generation*) were enumerated by the 452 participants. Most of the *younger-generation* members (98.5%) were participants' biological children of which 175 (13.8%) encouraged participants to screen for at least one of the three screenings. None of the nonbiological children were encouragers. Among the *same-generation* members (siblings/half siblings (81.8%), spouse/significant others (11.8%), friends (4.2%), and others (2.2%)), 38% of the spouses/significant others, 13.9% of the friends, and 8.6% of the siblings were encouragers. Among *older-generation* members (aunts/uncles (68.9%), mothers (12.3%), fathers (9.5%), grandparents (8.8%), and others (0.5%)), 28.3% of the mothers and 16.7% of the fathers were encouragers, and only 6.8% of aunts/uncles, and 6.9% of grandparents were encouragers.

Discussion

In this population of Mexican-origin Americans, having social network members who encourage screening, especially those of the older generation, is associated with higher levels of intention to screen. Complementing a previous study's finding that social influence reduces health-compromising behaviors,¹⁶ the current findings suggest that direct social influence (encouragement) may also help motivate health-promoting behaviors, and that having at least one encourager, not necessarily a larger number of encouragers, may be sufficient.

The presence of an older-generation encourager was consistently important in all screenings considered, potentially reflecting the Latino cultural value, *respeto* or respect for elders.²⁹ Older generations have important family health information that can be disseminated within families⁵¹ providing a family context in which health and health promotion can be discussed. Further, involvement of older generations will allow them to play important social roles within their networks, increasing the opportunity for reciprocal interactions and enhanced life satisfaction.⁵²

The findings of this study suggest two potential approaches to intervention. First, interventions may focus on recruiting natural encouragers suggested in this report (e.g., spouse/significant

others, mothers) to further facilitate desirable social interactions. Second, because over a half of the participants reported not having any encourager, and only 757 (11.9%) network members of the 6,353 were listed as encouragers, efforts to increase desirable social influence among network members who are not natural encouragers (e.g., fathers, grandparents) may also be beneficial. Mobilizing accessible network members who are not natural encouragers can be particularly important for this population in which over 70% were born in Mexico and had moved to the U.S, as it is possible that their natural encouragers still reside in Mexico. Investigating other characteristics of the network members (e.g., gender, geographic proximity) that may determine who are most influential and could be efficiently targeted would be valuable. The relationship quality (e.g., closeness) can determine the effectiveness of social influence processes,^{15,53} and needs to be considered in future health behavior research.

Results of this study showed that higher levels of causal attribution to the lifestyle factors (diet and exercise) were associated with higher levels of intention to participate in blood cholesterol and blood pressure screenings. Causal attribution of illness to the lifestyle factors has been shown to be associated with higher levels of perceived preventability.⁵⁴ This may explain the observed associations between lifestyle causal attribution and higher levels of screening intentions. A stronger causal attribution to genetics was associated with higher levels of intention to screen for blood glucose. Despite a concern that provision of genetic risk information may discourage individuals from engaging in health promoting behaviors,^{54,55} the current results suggest that genetic causal attribution can potentially be a motivator in this particular context. In one study, higher levels of genetic causal attribution of heart attack were associated with higher perceived treatment efficacy.⁵⁶ It may be that participants, who perceived genes as important disease causes, believed that undergoing blood glucose screening would help them manage the condition. Potential positive effects of genetic causal attribution on other health promoting behaviors should be investigated.

This study has some limitations. Participants were adults of Mexican origin living in a metropolitan city and thus the findings may not be generalizable to other populations or individuals with different social and cultural backgrounds. The cross-sectional nature of the data limits the ability to evaluate the causal associations between social influence and screening intentions. Furthermore, the high levels of intention to screen might reflect social desirability;⁵⁷ the lack of a measurement of their actual screening behaviors at a later time limits the ability to evaluate whether intentions lead to the actual screening outcomes.

The findings of this study suggest the need to evaluate interventions based on intergenerational social network as a means to increase screening behaviors in this population.

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Table 1Characteristics of the participants and their health beliefs ($n=452$).

	M (SD)	Range
Social network size	14.74 (6.21)	3 – 39
Age (years)	43.02 (13.98)	20 – 75
Number of personal diagnoses ^a	0.84 (1.06)	0 – 4
Years lived in U.S. among Mexican born	21.2 (9.96)	1 – 48
Family health risk	0.79 (0.66)	0 – 2
Risk perception	1.14 (0.71)	–0.43 – 3.16
Controllability	2.46 (0.82)	1 – 4
Causal belief: genes	3.41 (0.81)	1 – 4
Causal belief: lifestyle	3.64 (0.53)	1.25 – 4.00
<i>Proportions</i>		
Born in U.S.	26.8	
Survey in English	31.4	
Female	53.5	
At least a high school diploma	40.3	
Have health insurance	63.3	
Screened within past 2 years: blood cholesterol	72.2	
Screened within past 2 years: blood pressure	85.1	
Screened within past 2 years: blood glucose	76.2	
Usual source of healthcare provider ^b		
Private doctor's office	51.2	
Public health/community clinic	47.0	
Emergency room	3.4	
School/work clinic	1.2	
Outpatient clinic	1.0	
Do not have a usual source	9.3	

^a Heart disease, high blood pressure, high cholesterol, diabetes^b Participants could select more than one options.

Table 2

Predicting intentions to screen for blood cholesterol, blood pressure, and blood sugar

	Blood Cholesterol		Blood Pressure		Blood Sugar	
	Coefficient	p	Coefficient	p	Coefficient	p
Intercept	1.587	<0.001	1.173	<0.001	1.415	<0.001
Network size	0.001	0.916	0.007	0.084	0.003	0.474
Female	-0.059	0.270	-0.012	0.837	-0.035	0.533
At least a high school degree	0.035	0.622	0.040	0.543	0.001	0.990
Age (years)	0.018	<0.001	0.017	<0.001	0.020	<0.001
Born in U.S.	-0.086	0.276	-0.029	0.682	-0.064	0.337
Have health insurance	-0.021	0.722	0.038	0.510	-0.032	0.583
Number of diagnosis	0.053	0.086	0.018	0.527	0.032	0.271
Family risk for HD and DB	-0.013	0.783	-0.038	0.403	-0.033	0.485
Screened within past 2 years	0.353	<0.001	0.522	<0.001	0.556	<0.001
Risk perception	0.075	0.107	0.105	0.022	0.121	0.009
Perceived controllability	-0.024	0.500	0.049	0.117	-0.041	0.302
Causal belief: genes	-0.003	0.955	0.020	0.665	0.100	0.027
Causal belief: lifestyle	0.173	0.036	0.164	0.013	0.066	0.317
Have encourager: same-generation	0.194	0.002	NS	NS	NS	NS
Have encourager: older-generation	0.179	0.034	0.215	0.003	0.235	0.003