Published in final edited form as:

J Immigr Minor Health. 2012 December ; 14(6): 999–1005. doi:10.1007/s10903-012-9641-3.

Northwest Latinos' Health Promotion Lifestyle Profiles According to Diabetes Risk Status

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INTRODUCTION

Latinos living in the US are known to be disproportionately at risk for diabetes as compared to other racial and ethnic subgroups. Nationally 12.4% of all Latinos, 20 years of age or older, have diabetes and Latino individuals are twice as likely to have diabetes compared to non-Hispanic white individuals of similar age [1]. Within the Latino population, diabetes is more prevalent for Mexican Americans and Puerto Ricans, 13.3% and 13.8% respectively [2]. For those regions of the United States with a concentration of these Latino subgroups, monitoring and managing individuals at risk for diabetes is a major challenge for the local health care system.

The State of Idaho is a case in point. Although Idaho ranks 40th in the nation in overall population, it was the fourth fastest growing state from 2000 to 2010 with a 21% overall growth rate and with the Latino population going from 7.9 % in 2000 to 11.2% in 2011 [3]. The majority of the Latinos coming to Idaho are from Mexico [4]. Thus an estimated 9,229 to 10,700 new diabetics now reside in the State as of 2011 – many of whom are undocumented and almost all without adequate health insurance. Perhaps reflecting these realities, the latest Idaho Behavioral Risk Factor Surveillance Survey data document the Hispanic death rate attributable to diabetes as 32% higher than non-Hispanic whites [5]. The only other available data on the status of the Latino population are from the Idaho Partnership for Hispanic Health where 11.7 % of respondents self-reported diabetes [6].

Not only is the epidemiological information on Latinos and diabetes very limited, there is virtually nothing known anywhere in the country about important elements of risk, specifically lifestyle. Lifestyle as defined by diet and exercise is well documented to be related to the emergence of diabetes. Clinical trials such as the Diabetes Prevention Program (DPP) demonstrated how a relatively modest weight loss achieved through changes in diet and exercise reduced the development of diabetes by 58%. This held true for all ethnic groups regardless of age [7]. Two Cochrane reviews found behavioral interventions, including weight loss and exercise, significantly reduced the incidence of diabetes for people in the pre-diabetes stage [8, 9]. Of note is the fact that all the evidence cited here on the causal relationship between lifestyle and diabetes combines self report with clinically accurate measures of diabetic status or impaired glucose intolerance. Determination of an individual's ability to process insulin is best achieved through assessment of glycated hemoglobin (HbA1c) since this provides the most stable reading of glucose levels over time [10].

The purpose of the present study is to summarize the association of the diabetes risk status as measured by glycated hemoglobin with self- reported lifestyle for a community based sample of Latinos residing in a midsize city in Idaho and self-identified as having a concern

about diabetes and/or a family history with diabetes. The relationship of diabetes risk and lifestyle are categorized according to age and gender in order to prioritize risk and to pinpoint subgroups that would potentially benefit most from intervention.

Theoretical/conceptual framework

Evidence from such efforts as the DPP combining information about individual lifestyle and impaired glucose tolerance suggests that similar profiles should be obtained on high risk groups such as Hispanics. However to date, such profiles are not available. In the absence of data connecting clinically reliable measures of risk status with measures of lifestyle, it is difficult both to identify subgroups at elevated risk for emergence of the disease, and to construct and deliver effective interventions.

Pender's revised Health Promotion Model was used to guide the examination of health promoting lifestyle and biophysical measures among Hispanic adults [11]. The theoretical perspective explains why individuals engage in health behaviors and identifies factors contributing to the adoption of health promoting behavior. The model guides the conduct of health behavior assessment by allowing the examination of the processes involved that motivate persons to improve their health. The model's assessment of individual characteristics includes prior related behaviors and personal factors, including biological, psychological, and socio-cultural components. The Health Promoting Lifestyle II (HPLPII) measures the frequency of health promoting behaviors and reflects the extent to which participants actively engage in health promotion, as opposed to disease prevention [12]. For an at-risk population, examining the level of engagement in health promotion provides baseline data to help inform the development of health promotion interventions.

METHODS

Study Participants

Participants were recruited April and June 2009 and again between August and October 2010 from two churches located in a suburb of a large city in Idaho in cooperation with the Latino Health Coalition (LHC) and faith community pastoral staff. The convenience sample consisted of 225 subjects who met the following criteria: self-reported Latino adults over the age of 18 who speak and/or understand Spanish and/or English, with either a concern about diabetes and/or a family history of diabetes. Exclusion criteria were recent use of oral steroid medication, pregnant women, and the diagnosis of type 1 diabetes. Recruitment strategies included announcements in church bulletins, information sessions and distribution of informational fliers. Members of the LHC served as interpreters and assisted with recruitment.

Data Collection

The Boise State University Office of Research Compliance and cooperating churches approved the research. Multiple morning data collection sessions were held to accommodate the working schedules of participants and the fasting status necessary for blood sample collection. Baseline health assessment data were collected either in Spanish or English after obtaining study participants' informed consent.

Measures

Demographic information was collected through a questionnaire that inquired about age, household composition, educational level, country of origin and years in the United States. Interpreters were available to help clarify any concerns or confusion about specific questions and/or testing procedures. Forty four, or 20% of participants, used the English HPLP.

The health promoting lifestyles of Latino congregants were measured using the English or Spanish version of the HPLP II [13], a revision of the HPLP developed by Walker et al [14]. The instrument is a 52-item rating scale measuring the frequency of self-reported health behaviors on six subscales, 1) health promoting lifestyle responsibility, 2) physical activity, 3) nutrition, 4) spiritual growth, 5) interpersonal relations, and 6) stress management. The health-promoting lifestyle composite summarizes all of the items on the questionnaire. The responses are recorded as never, sometimes, often or routinely and are summed and averaged to obtain a score for the subscales and the overall HPLP II. Higher scores reflect greater participation in health promoting behavior. The instrument has undergone extensive testing for validity and reliability in both Spanish and English [15, 16, 17, 18].

Biophysical measures

Biophysical measures included body composition analysis (skinfolds), height, weight, blood pressure, a lipid panel, and a diabetes screening panel. The results of the body composition and lipid results are reported elsewhere. The diabetes screening panel included a fasting blood glucose, insulin level, and glycosylated hemoglobin A1c (HbA1c). Participants were instructed to refrain from eating after midnight the day of data collection. The clinical laboratory's methodology for A1C's was high performance liquid chromatography [19]

Statistical Analysis

All data analyses were done using either SPSS (v17.0; SPSS Inc, Chicago) or SAS (v 9.2; SAS Institute, Carey, NC). Laboratory results were classified according to the American Diabetes Association diagnostic criteria for HbA1c (Normal <5.7%, At risk <6.0%, High Risk < 6.5%, Diabetes 6.5% and higher) [20]. Average scores were calculated for the subscales of the HPLP II. Internal consistency was confirmed of the total and six subscales of the HPLP II in this population using Cronbach's alpha. Analysis of variance was used to identify the existence of statistical differences in HPLP II dimensions by age, gender, and diabetes risk status. Where statistical significance was found, pair-wise comparisons were made and the p-values adjusted using a step-up Bonferroni adjustment to control for multiple comparisons at 5 % [21]. Analysis of variance was also used to test for potential age and gender differences on the original (not categorized) HbA1c readings. A chi-square test examined the relationship between visits to a health provider in the last 12 months, and diabetes risk.

RESULTS

Descriptive Characteristics

Table I presents the sample characteristics of 225 Latino participants (93 men and 132 women) from two different faith communities. Three quarters of the participants were married, and 20 % were over the age of 55. Most participants (88%) had less than a high school education; seven % had a high school diploma or equivalent, and the rest had attained at least some college. The majority (72%) of participants were from Mexico, with the next largest group from the United States. Of those respondents indicating length of time in the U.S., 60 % have lived here 11 or more years. Three quarters of the participants speak Spanish at home, with the remainder evenly divided between speaking English and speaking both English and Spanish at home.

The average household income ranged from \$15–25,000 and 59.2% of the participants were uninsured. Approximately 50 % of the respondents visited some kind of health care provider between one and three times in the last year and 38 % reported visiting no type of health care provider in that same time period; 59 % indicated they did not have any form of health insurance. No relationship exists between the number of health provider visits in the last 12

months, and diabetes risk. Nine percent of the participants reported using some type of alternative medicines or herbal products. Health Promoting Lifestyle Profile II

In a two-way analysis of variance with the HPLP II dimensions as the dependent measures and with gender and risk status as factors, one main effect for gender was observed on the Health Responsibility Scale with women being 0.30 units higher on this scale than men ($F = 5.36, p < 0.02$). Additionally, two statistically significant gender by risk status interactions were found with one on the Stress Management Scale ($F = 3.54, p < 0.02$) and the other on the Health Promotion Lifestyle Scale ($F = 2.84, p < 0.04$), but the adjusted p-values of the pairwise differences were not significant. No statistically significant differences were observed among groups on any of the Health Lifestyle Scales using age and risk status as factors in a second two-way analysis of variance (Table II)

Diabetes status

The means of HbA1c for all participants and by age and gender was calculated with an average HbA1c of 5.84, categorized as “risk”. The analysis shows that the estimated HbA1c is statistically lower for those 55 and younger than for those 56 and older, but there are no differences among younger participants, and no differences between men and women. (Table III)

DISCUSSION

This study examines the diabetes risk profile of a low income and low education, primarily married and middle aged sample of Hispanics living in a mid-size Idaho city with sufficient concern about diabetes to volunteer for a physical assessment for risk status for the disease. Self report of elements of health promoting lifestyle behaviors known to be related to the emergence of chronic disease were analyzed according to risk status for diabetes as determined with an assessment of the participant’s level of plasma glucose concentration (HbA1c). Analysis of lifestyle information according to these laboratory results found virtually no differences in self-reported lifestyle across risk status. From no risk for the disease to full blown diabetes, the respondents reported engaging in basically the same levels of physical activity, monitoring of nutrition and taking responsibility for their health. The conclusion regarding this last dimension is reinforced by the lack of statistical association between health care provider visits in the last year, and diabetes risk.

Before considering the implications of this study for the prevention and management of chronic disease, we acknowledge a number of limitations. First, the respondents’ accuracy of lifestyle choices and activities could not be independently verified. We recognize that there may be inherent inaccuracies in self-reports. A second methodological problem has to do with the self-selection of the participants in the study. Participants were recruited by church bulletin announcements, information sessions before and after church services, and distribution of fliers. Every effort was made to disseminate broadly the opportunity to be involved in this study. Nevertheless, it is likely that individuals fearful of identification, unconcerned or unaware about their potential for diabetes, and/or uninterested in their personal health are under-represented in this sample.

The implications for this study are nonetheless framed in part by the nature of the sample recruited for participation. Although 72% had been born in Mexico, 69% have resided in the United States for more than 11 years and are employed in a range of jobs such as food service, manufacturing and construction. The length of residence and work history distinguishes these individuals from transient immigrant labor groups and from the population on the U.S. Mexico border [22]. It is likely that many of our study participants

will remain in the U.S. indefinitely, as other Hispanic families have done in smaller towns across various regions of the U.S.

As part of a broader residential community, the question of how chronic diseases such as diabetes are managed becomes a concern beyond the immediate family and Hispanic neighborhood. The overall profile summarized here suggests that the relationship between elements of life style and disease progression are not well understood even though all the participants had enough interest and/or concern about this health issue to submit to a physical assessment and laboratory procedures. Further, the results suggest the national message of healthy lifestyles has not had an effect on this population thus when confronted with symptoms of diabetes, minimal efforts to seek medical assistance or control the disease through lifestyle changes are employed.

Significant lack of knowledge about diabetes has been observed in other studies of Hispanics [23, 24, 25, 26] but the coupling of physiological standing with self report underscores the importance of basic education. Lack of affordable access to health care is a likely partial explanation for failure to seek help from health care professionals. However a broader confluence of cultural beliefs and understanding risk may also contribute to an absence of preventive self-management. The Latino population may not consider themselves at greater risk for diabetes than other groups unless they have a family member with diabetes or have had a personal diagnostic test [27]. Moreover, although diabetes is considered an important health condition, Latinos ranked it third behind alcoholism and drug use, which are seen as more important and immediate concerns [28]. Additional research is needed to better understand the interplay between cultural issues and the role of insurance. A next step towards this understanding might be comparing the self-reported lifestyle measures used and physiological measures in this study against a sample of individuals with health insurance from the same locale.

The report of utilization of health care services, showing no difference in the use of health care services by risk status, underscores the challenges of providing timely health care to this population. In the context of what services are actually available for the Latinos participating in the study, it is also important to note that few if any would have had access to glycated hemoglobin testing in the usual course of the health care available to them. With a cost of \$50 – \$75, requiring a doctor's visit and potentially insurance (both of which are barriers in our participants), the test is beyond the means of many of these low income individuals or their families, regardless of family history of diabetes or other risk factors

NEW CONTRIBUTION TO THE LITERATURE

This is the first study to document the relationship between actual clinical risk standing for diabetes and engagement in behaviors that either exacerbate or temper that disease for a community based, long term residential Northwest Hispanic sample self-selected for interest in and/or concern about diabetes. Beyond these pragmatic realities of what is available in the current health care system is a broader question of how to promote healthier lifestyles aimed at the prevention of the disease for those who do not evidence elevated glucose levels, or, the management of the disease for those individuals who test at high risk for diabetes. For those committed to the promotion of regular, moderate exercise and more balanced diets for the control of diabetes, the results of this study should be troubling because individuals motivated enough to seek clinical confirmation of their risk status had no apparent understanding of the role of lifestyle in disease management. The findings point to the imperative of a broad, comprehensive and especially culturally attuned educational campaign on basic disease pathophysiology, the value of prevention for individual health, and the necessity of day-to-day self-care should diabetes be diagnosed. Such educational

efforts are likely to become even more important as the genetic susceptibility for chronic diseases such as diabetes becomes better understood for certain population subgroups. [29, 30]. Delay of the expression of the disease for those with a genetic disposition for diabetes will require vigilant self-management and monitoring in the way suggested here.

Acknowledgments

This research was funded by an Internal Grant from Boise State University School of Nursing and the College of Health Sciences. We would like to acknowledge the assistance of Jonathan Glogowski, RN, BSN for his contribution to this project.

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Table I

Demographic characteristics and diabetes self-report status

	<i>n</i> = 225	Column % (<i>n</i>)
Age		
18–35	68	31.6
36–55	104	48.4
56 and older	43	20.0
Total	215 [*]	
Gender		
Male	93	58.7
Female	132	41.3
Total	225	
Language spoken at home		
Spanish	171	76.3
English	26	11.6
Bilingual	27	12.1
Total	224	
Country of Origin		
Mexico	162	72.0
U.S.A.	26	11.6
Central America	27	12
Other	10	4.4
Total	216 [*]	
Years in US		
5 years or fewer	16	10.3
6–10 years	32	20.6
11 years or more	107	69.0
Total	155 [*]	
Education level		
Primary school	65	28.9
Middle school	44	19.6
Some high school	60	26.7
HS graduate	16	7.1
Some college	6	2.7
College graduate	4	1.7
Unspecified	30 [*]	13.3
Uninsured	129	59.2
Health care provider visits in the last year		

	<i>n</i> = 225	Column % (<i>n</i>)
Never	76	38.0
1–3 times	103	51.4
4–6 times	9	4.5
7 or more times	12	6.0

*
not all participants reported data

Table II
Means and Standard Deviations on Health Promoting Lifestyle Profile By Diabetes Risk (Hemoglobin A1c) and Gender

Risk Status ^a	Health Promoting Lifestyle Profile	Women ^b		Men	
		Mean	Standard Deviation	Mean	Standard Deviation
Normal	Health Responsibility	2.17	.59	1.88	.58
	Physical Activity	1.96	.58	1.96	.58
	Nutrition	2.56	.56	2.41	.51
	Spiritual Growth	2.75	.57	2.72	.56
	Interpersonal Relations	2.56	.56	2.50	.54
	Stress Management	2.19	.49	2.23	.41
At risk	Health-Promoting Lifestyle	2.37	.47	2.29	.42
	Health Responsibility	2.51	.62	1.84	.57
	Physical Activity	2.29	.78	1.88	.62
	Nutrition	2.75	.56	2.30	.47
	Spiritual Growth	2.93	.52	2.66	.50
	Interpersonal Relations	2.73	.53	2.46	.36
High risk	Stress Management	2.40	.61	2.03	.47
	Health-Promoting Lifestyle	2.62	.49	2.20	.42
	Health Responsibility	2.07	.51	2.03	.71
	Physical Activity	1.79	.47	2.14	.64
	Nutrition	2.34	.44	2.52	.38
	Spiritual Growth	2.55	.48	3.03	.66
Diabetes	Interpersonal Relations	2.50	.45	2.70	.60
	Stress Management	2.06	.41	2.55	.57
	Health-Promoting Lifestyle	2.23	.37	2.50	.47
	Health Responsibility	2.23	.52	2.29	.69
	Physical Activity	1.92	.55	1.97	.76
	Nutrition	2.50	.47	2.43	.59
	Spiritual Growth	2.84	.56	2.89	.52
	Interpersonal Relations	2.69	.45	2.60	.71

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Risk Status ^a	Health Promoting Lifestyle Profile	Women ^b		Men	
		Mean	Standard Deviation	Mean	Standard Deviation
	Stress Management	2.39	.56	2.47	.52
	Health-Promoting Lifestyle	2.44	.36	2.45	.56

Normal Sample: Women = 75; Men = 57; At Risk Sample: Women = 27; Men = 13; High Risk Sample: Women = 10; Men = 20; Men = 11.

^aGender by risk status interaction for stress management ($p < .02$) and health promotion ($p < .04$)

^bGender main effect for health responsibility ($p < .02$)

Table III

Hemoglobin A1c Average Values According to Age and Gender

Hemoglobin A1c, By age and gender						
Age	Women			Men		
	Count	Mean	Standard Deviation	Count	Mean	Standard Deviation
18–35	46	5.35	.36	22	5.48	.43
36–55	56	5.99	1.57	48	5.64	.56
56 and older	26	6.78	1.59	17	6.32	1.22