Factors Influencing Health Care Utilization in Older Hispanics with Diabetes along the Texas-Mexico Border

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Abstract

Little is known about predictors of health care utilization for older Hispanics with chronic conditions. This study aimed to determine: (1) the level of health care access for older Hispanics with type 2 diabetes living in a US–Mexico border area; and (2) personal and health correlates to health care utilization (ie, physician visits, eye care, emergency room [ER] use). This was a cross-sectional study based on a community assessment conducted at a clinic, senior centers, and *colonias*. Colonias are impoverished neighborhoods with substandard living conditions along the US–Mexico border. Hispanics living in colonias are one of the most disadvantaged minority groups in the United States. The study sample consisted of 249 Hispanics age 60 years and older who have type 2 diabetes. Descriptive analyses, multiple linear regression, and generalized linear models were conducted. Older age ($P=0.02$) and affordability of physician fees ($P=0.02$) were significant correlates to more frequent physician visits. Factors significantly associated with eye care were being insured ($P=0.001$) and reporting high cholesterol ($P=0.005$). ER use was significantly associated with younger age (60–64 years old; $P=0.03$) and suffering from hypertension ($P=0.02$). Those who received diabetes education ($P=0.04$) were less likely to use the ER. Identifying patterns of health care utilization services in aging underserved minorities who are disproportionately affected by diabetes may lead to culturally appropriate preventive practices and timely access to health care. Adequate health care access can decrease or delay the onset of diabetes complications in older Hispanics with type 2 diabetes who live along the US–Mexico border. (*Population Health Management* 2012;15:149–156)

Introduction

THE HISPANIC POPULATION IN THE UNITED STATES is aging rapidly¹ and is disproportionately affected by type 2 diabetes.² The diabetes disparity is especially evident along the United States–Mexico border. Diabetes mortality and prevalence rates for border Hispanic adults are 2 to 3 times higher than for non-Hispanic whites.^{3,4} In the border region known as the Rio Grande Valley in South Texas, where this study was conducted, diabetes prevalence among aging Hispanics (28%) is higher than the national level (18%), as well as other US areas with large Hispanic populations including San Antonio (24%) and Houston (21%) in Texas, and San Diego (17%) in California (E. Moy, unpublished data, Hispanic Elders Community Chartbook, 2007). Studies also

show that older Hispanics in the Rio Grande Valley receive less diabetes education and clinical testing, and fewer eye examinations than their non-Hispanic white counterparts (E. Moy, unpublished data, Hispanic Elders Community Chartbook, 2007).

Although preventive practices and regular care are effective at reducing or delaying the onset of diabetes complications,⁵ Hispanics have less access to preventive services than their non-Hispanic white counterparts.^{6–8} Research among older Hispanics suffering from different chronic conditions shows that health care utilization is associated with aging, sex, insurance, chronic conditions, and having a regular health provider.^{9,10} However, there is a paucity of studies examining predictors of health care access in aging Hispanics with type 2 diabetes in the United States.

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Understanding health care predictors in the rapidly growing minority aging population with diabetes may facilitate diabetes preventive care and reduce diabetes complications and ethnic disparities. The objectives of this study were: (1) to determine the level of access to health care services among underserved older Hispanics with type 2 diabetes living in the Texas–Mexico border area; and (2) to identify sociodemographic and health-related correlates to health care utilization among this population.

Methods

Data source

In 2007, the Lower Rio Grande Valley Community Partnership (LRGVCP) was established in response to a national initiative organized by the United States Department of Health and Human Services to address health disparities affecting older Hispanics. The LRGVCP comprises local stakeholder organizations that serve Hispanics in the Rio Grande Valley in South Texas. As part of the LRGVCP strategies, a community-based health assessment was conducted in 2008. The current study draws from the assessment data.

Population studied

The LRGVCP health assessment included Hispanics with type 2 diabetes, who were 60 years of age and older, and living in Hidalgo County, Texas, at the Texas–Mexico border. Hidalgo is one of the 10 poorest counties in the United States; approximately one third of its aging population lives below the federal poverty level.¹¹ The majority of the Hidalgo population is of Mexican descent (83.9%) and speaks Spanish at home (83%).¹² One third of Hidalgo residents have no health insurance.¹³ In this region, Hispanics living in areas known as *colonias* belong to one of the most disadvantaged, hard-to-reach minority groups in the United States.

Colonias are unincorporated, impoverished settlements located within or beyond the extraterritorial jurisdiction of cities along the US–Mexico international boundary, in which many people lack basic services (eg, drainage, paving, street lighting).¹⁴ Studies estimate there are 1524 colonias in Texas with almost 400,000 inhabitants. An estimated 60% of these colonias are located in Hidalgo County, where the health assessment was conducted.¹⁵

To maximize recruitment, certified *promotoras* (community health workers) recruited participants in both clinical and community settings, including: a federally-qualified community health clinic that provides services for the uninsured and low-income individuals, and 2 nonclinical-based settings (community senior centers and colonias). Study eligibility criteria included being Hispanic, being 60 years of age and older, having been diagnosed with type 2 diabetes (self-report), and being willing to participate. Participants were recruited into the study using a convenience sampling technique. The response rate was 86%. A total of 291 eligible participants were asked to participate, but 42 declined; the sample size for this study was 249.

Measures

Face-to-face interviews were conducted with participants using a 94-item questionnaire. The health assessment survey

was developed to examine demographics, diabetes-related comorbidities and complications, access to health care services, and exposure to diabetes education. The survey was developed by the LRGVCP based on diabetes-related items from the Massachusetts Behavioral Risk Factor Surveillance System Survey and health care utilization-related questions from the National Health Interview Survey. It took participants about 30 minutes to complete the survey.

Trained certified promotoras and graduate students conducted the interviews in both Spanish and English, according to respondents' preference. The Spanish translation of the questionnaire was completed using a modified direct translation technique by a bilingual Hispanic researcher native from Hidalgo County, and then revised by a panel of 6 bilingual Hispanic local community leaders and researchers. This study was approved by the Texas A&M University Institutional Review Board.

The health care utilization dependent variables in this study were physician visits, eye care, and emergency room (ER) use. Physician visits were measured by asking participants, "About how many times in the past 6 months have you seen a doctor, nurse, or other health professional for your diabetes?" Eye care was assessed using the question, "When was the last time you had an eye exam in which the pupils were dilated?" Although possible responses included "within the past month, past year, past 2 years, 2 or more years ago, or never," for data analyses purposes, this variable was dichotomized as "yes" or "no" to indicate whether the participant received an eye exam in the previous 12 months. ER use was measured by asking, "During the past 12 months, how many times have you gone to a hospital emergency room about your own health?" The ER variable was dichotomized as "never" or "1 or more times."

Independent variables were identified based on the literature underlining predictors of health care utilization in Hispanic and Mexican adults,^{9,16,17} including demographic and health-related variables. Demographic variables were sex, marital status (married, not married), age (60–64, 65–74, 75 years or older), education level (less than high school, all other completed grades), health insurance (uninsured, insured), living situation (alone, not alone), colonia residency (yes/no), and recruitment location (nonclinical based, clinical based). The income variable was not included in the analyses because of missing values (30.9%). Health-related variables included: hypertension (self-reported as yes/no), high cholesterol (self-reported as yes/no), obesity (yes/no), taking insulin (self-reported as yes/no), ability to afford medications (yes/no), ability to afford physician visits (yes/no), and exposure to diabetes education (yes/no). Obesity status was measured using body mass index, expressed as weight in kilograms divided by the square of height in meters (30 kg/m² and higher was considered obese) and categorized according to Centers for Disease Control and Prevention parameters.¹⁸ We examined significant differences in demographic, health, and health care characteristics between participants who were recruited in community centers and colonias versus respondents recruited in the clinical setting.

Analyses

Descriptive statistics were used to establish comparisons in the distribution of demographic characteristics and health

outcomes by colonia residency and recruiting site. Pair-wise explorations on single factor's effect on the dependent variables were performed using the chi-square test, analysis of variance (ANOVA), or Welch ANOVA. For physician visits, we employed a multiple linear regression model to evaluate the independent variables effects. We estimated logistic regression models to evaluate the contribution of independent variables to eye care and ER use. Each of the hypothesized models was found to jointly predict the corresponding dependent variable according to model fitting criteria and prediction power. The effect sizes of the models were reported by R^2 and adjusted R^2 for the multiple linear regression and by Nagelkerke R^2 for the logistic regressions. Analyses were performed using PASW (formerly known as SPSS) version 18 (IBM, Chicago, IL).

Results

Demographic description

Table 1 shows demographic and health characteristics of participants by colonia residency and recruitment location. More than half of the respondents were recruited in a clinical setting. Over 85% of participants recruited at nonclinical sites lived in a colonia, while only 52.0% of participants recruited at the clinical site were colonia residents. Colonia residency and recruitment location were significantly associated ($P < 0.001$).

Significantly more colonia residents had insurance compared to noncolonia respondents, whereas significantly more noncolonia residents lived alone compared to those living in a colonia. Significantly more noncolonia residents had higher rates of hypertension and were taking insulin. More colonia residents were able to afford medicines than noncolonia residents.

When comparing participant characteristics by recruitment location, results show that significantly fewer clinic respondents were insured and able to afford medicines than their counterparts recruited from nonclinic sites. Almost 2 times more noncolonia residents and clinic respondents received diabetes education when compared to colonia residents and nonclinic respondents.

Table 1 also shows the distribution of health care services related to physician visits, eye care, and ER use (dependent variables) by colonia residency and recruitment site. Participants who lived in a colonia visited the physician significantly more times than those who did not reside in a colonia. Also, nonclinic-based participants reported significantly more visits to the physician than those recruited in a clinical site. There were no significant differences in annual examinations or ER use by colonia residency and recruitment site.

Correlates to health care utilization services

Table 2 presents the results from the pairwise exploration and multiple regression analyses to examine correlates to physician visits. Pairwise exploration analyses show that statistically significant factors associated with physician visits were colonia residency, being recruited from a non-clinic setting, age, insurance, and ability to pay for physician visits. In the multiple regression analyses, the average number of physician visits for respondents who were 75 years of age and older was 0.99 more than for those aged

60–74. The average number of physician visits for respondents who could not afford doctor visits was 1.01 less than for respondents who could afford the cost.

Table 3 shows eye care correlates from the pairwise exploration and logistic regression analyses. In the exploration analyses we found that having insurance, high cholesterol, and being able to pay for medicines and doctor visits were significant correlates to eye care. The logistic regression analysis indicates factors significantly associated with eye care were having insurance and high cholesterol.

Table 4 presents ER correlates findings from the pairwise exploration and logistic regression analyses. In the initial analyses only high blood pressure was significantly associated with ER. The logistic regression revealed that significant correlates to ER included being younger (60–64) and suffering from hypertension. There was a significant negative correlation between diabetes education and ER use.

Discussion

This study examined the extent of access to health care services and factors associated with the utilization of services among an economically disadvantaged population in the United States. One main finding in this study is that participants who resided in a colonia and were recruited from a community setting visited the physician significantly more often than those not residing in a colonia and recruited from a clinical site. Although our study did not investigate specific diabetes-related reasons for physician visits, a possible explanation for more frequent physician visits among colonia residents and community-based recruited participants could be advanced stages of disease or unavailability of timely screening and optimal treatment. One previous study of older Hispanics with various medical conditions showed a significant association between physician visits and diabetes complications.¹⁹ More research is needed to determine if more frequent physician visits among older persons with diabetes is attributed to suboptimal diabetes control and the factors that contribute to suboptimal control.

Our study found older age to be a predictor of more frequent physician visits, which supports previous research.^{9,10} Having insurance also has been identified as a predictor of doctor visits.^{9,16} Although our study did not confirm this finding, our results showed a significant association between being able to afford physician fees and visits. It is possible that older border Hispanics with diabetes who can afford physician visits tend to obtain care from federally qualified community health centers, which provide services on an income-scale basis in the US border region, regardless of insurance status.

An important component in diabetes care is regular eye screenings to reduce the risk of vision loss or delay its occurrence.²⁰ Our study found that nearly two thirds of participants (62%) received an annual eye examination, a lower proportion compared to aging persons with diabetes at the national (79%) and state (88%) levels,^{21,22} but higher than a study of rural Hispanics with diabetes (48.9%).²³ This finding may be attributed to pronounced barriers to eye care within this border population. Previous studies among border residents indicate that low-income adults perceive access to medical care to be difficult^{24,25} and lack of transportation in colonias to be problematic.²⁶ Another explanation is the insufficient number of eye care professionals practicing in

TABLE 1. PERCENTAGES FOR BOTH DEPENDENT AND INDEPENDENT VARIABLES BY *COLONIA* RESIDENCY AND RECRUITING SITE (*N*=249)

Variables	Total (%) ^a	Colonia residency (%) ^a			Recruiting site (%) ^a		
		Yes	No	P value ^b	Clinical	Nonclinical	P value ^b
Recruiting site							
Clinical	60.6	44.3	81.3	0.001			
Nonclinical	39.4	55.7	18.7				
Independent Variables							
Demographic							
Age							
60–64	41.9	41.9	42.7	0.78	45.3	36.7	0.28
65–74	42.3	43.9	40.0		41.3	43.9	
≥75	15.7	14.2	17.3		13.3	19.4	
Sex							
Female	65.9	68.5	57.3	0.10	66.2	65.3	0.88
Male	34.1	31.5	42.7		33.8	34.7	
Education level							
< High school	84.6	85.0	78.4	0.22	85.9	82.5	0.47
≥ High school	15.4	15.0	21.6		14.1	17.5	
Insurance							
Insured	59.2	68.3	52.1	0.02	44.0	81.4	<0.001
Uninsured	40.8	31.7	47.9		56.0	18.6	
Living situation							
Alone	18.7	14.3	28.0	0.01	17.4	20.6	0.53
Not alone	81.3	85.7	72.0		82.6	79.4	
Health conditions							
High blood pressure							
Yes	81.5	76.4	90.7	0.01	84.7	76.5	0.11
No	18.5	23.6	9.3		15.3	23.5	
High cholesterol							
Yes	63.0	60.5	64.8	0.55	66.7	57.3	0.14
No	37.0	39.5	35.2		33.3	42.7	
Taking insulin							
Yes	24.6	20.8	33.3	0.04	27.3	20.4	0.22
No	75.4	79.2	66.7		72.7	79.6	
Obese							
Yes	64.8	67.1	66.2	0.89	61.3	70.2	0.16
No	35.2	32.9	33.8		38.7	29.8	
Other health-related factors							
Able to afford medicines							
No	32.2	43.6	27.0	0.02	44.7	32.7	0.06
Yes	67.8	56.4	73.0		55.3	67.3	
Able to afford doctor visits							
No	39.9	30.4	26.4	0.54	38.5	22.7	0.01
Yes	60.1	69.6	73.6		61.5	77.3	
Received diabetes education							
Yes	25.9	22.1	39.7	0.006	32.9	15.3	0.002
No	74.1	77.9	60.3		61.7	84.7	
Dependent Variables							
Physician visits (mean±SD) ^c		2.74±1.82	2.17±1.40	0.03	2.21±1.31	2.95±2.10	0.001
Annual eye exam ^d							
Yes	61.7	60.1	69.3	0.18	60.3	63.9	0.54
No	38.3	39.9	30.7		39.7	36.1	
Emergency room use ^e							
0 times	75.6	75.2	77.8	0.67	77.0	73.5	0.53
≥1times	24.4	24.8	22.2		23.0	26.5	

^aValid percent based on the number of valid cases, *n*.^bAssociations were studied by chi-square tests, except that analysis of variance was used for physician visits.^cVariable refers to mean number of physician visits in the past 6 months. Means/standard deviations are shown.^dVariable shows if participants did or did not receive an annual eye examination in the past 12 months.^eVariable refers to number of times participants visited the emergency room in the past 12 months.

TABLE 2. RESULTS FROM MULTIPLE REGRESSION AND PAIRWISE EXPLORATION (ANOVA AND MULTIPLE COMPARISONS) FOR DEPENDENT VARIABLE, PHYSICIAN VISITS

Factors	Multiple Regression			ANOVA P value
	B ^a	95% CI of B	Beta ^a	
Colonia (ref. non-colonia)				0.03
Colonia residents	0.46	(-0.15, 1.06)	0.12	
Clinic (ref. nonclinic)				0.02
Clinic respondent	-0.35	(-0.96, 0.26)	-0.10	
Age (ref. 60-64)				0.01 ^c
65-74	-0.54	(-1.13, 0.05)	-0.16	
75 and older	0.99*	(0.15, 1.83)	0.20	
Sex (ref. female)				0.81
Male	-0.04	(-0.57, 0.49)	-0.01	
Education level (ref. < high school)				0.35
≥ High school	-0.15	(-0.87, 0.56)	-0.03	
Insurance (ref. Uninsured)				0.05
Insured	0.20	(-0.45, 0.84)	0.06	
Living with (ref. alone)				0.78
Not alone	0.01	(-0.70, 0.71)	0.00	
High blood pressure (ref. no)				0.81
Yes	-0.07	(-0.74, 0.61)	-0.02	
High cholesterol (ref. no)				0.99
Yes	0.10	(-0.45, 0.66)	0.03	
Taking insulin (ref. no)				0.52
Yes	0.35	(-0.29, 0.99)	0.08	
Obese (ref. no)				0.74
Yes	-0.03	(-0.57, 0.50)	-0.01	
Able to afford medicines (ref. Yes)				0.33
No	0.43	(-0.31, 1.18)	0.12	
Able to afford physician visits (ref. yes)				0.005
No	-1.01*	(-1.83, -0.19)	-0.26	
Received diabetes education (ref. no)				0.36
Yes	-0.18	(-0.80, 0.44)	-0.05	
Intercept	2.75**	(1.09, 4.41)		
R ²	0.18			
Adjusted R ²	0.10			

^aB is unstandardized coefficients, and Beta is standardized coefficients.
B coefficient significant at 0.05 level labeled by *; significant at 0.01 level labeled by **.

^cMultiple comparisons yielded significant difference ($P=0.005$) between 2 age groups: 65-74 group and 75 and older group.

ANOVA, analysis of variance; CI, confidence interval.

TABLE 3. RESULTS FROM LOGISTIC REGRESSION AND PAIRWISE EXPLORATION (CHI-SQUARE TESTS) FOR DEPENDENT VARIABLE, ANNUAL EYE CARE

Factors	Logistic Regression		Chi-square tests P value
	Odds Ratio ^a	95% CI	
Colonia (ref. non-colonia)			0.70
Colonia residents	1.10	(0.45, 2.70)	
Clinic (ref. nonclinic)			0.49
Clinic respondent	1.23	(0.51, 2.99)	
Age (ref. 60-64)			0.35
65-74	1.17	(0.48, 2.85)	
75 and older	0.74	(0.22, 2.47)	
Sex (ref. female)			0.13
Male	2.06	(0.90, 4.70)	
Education level (ref. < high school)			0.64
≥ High school	0.96	(0.33, 2.80)	
Insurance (ref. Uninsured)			$P<0.001$
Insured	5.37**	(2.03, 14.17)	
Living with (ref. alone)			0.66
Not alone	0.94	(0.34, 2.56)	
High blood pressure (ref. no)			0.01
Yes	1.80	(0.73, 4.40)	
High cholesterol (ref. no)			0.003
Yes	3.08**	(1.41, 6.77)	
Taking insulin (ref. no)			0.05
Yes	1.38	(0.52, 3.69)	
Obese (ref. no)			0.45
Yes	1.76	(0.81, 3.84)	
Able to afford medicines (ref. Yes)			0.02
No	0.41	(0.14, 1.19)	
Able to afford physician visits (ref. yes)			0.02
No	1.51	(0.47, 4.82)	
Received diabetes education (ref. no)			0.20
Yes	1.41	(0.56, 3.52)	
Intercept	0.13*		
LR χ^2	41.84 (df=15), $P<0.001$		
Nagelkerke R ²	0.29		
Correct Prediction Percentage	71.6%		

^aOdds ratio significant at 0.05 labeled by *; significant at 0.01 labeled by **.
CI, confidence interval.

Hidalgo County, which is designated as a "health professional shortage area."²⁷ Further research is needed to determine the reasons why older Hispanics with diabetes in this border region have limited access to eye care.

In our study, we found having insurance was significantly correlated to eye care, which confirms previous research.²⁸ Our results also show that suffering from high cholesterol is a predictor of eye screenings. One explanation of this finding may be that because high cholesterol is a risk factor for retinopathy (as found in research conducted in Europe),^{29,30} individuals suffering from high cholesterol may have been aware of this association and understood the importance of seeking annual eye examinations.

TABLE 4. RESULTS FROM LOGISTIC REGRESSION AND PAIRWISE EXPLORATION (CHI-SQUARE TESTS) FOR DEPENDENT VARIABLE, EMERGENCY ROOM USE

Factors	Logistic Regression		Chi-square tests P value
	Odds Ratio ^a	95% CI	
Colonia (ref. non-colonia)			0.71
Colonia residents	.88	(0.34, 2.30)	
Clinic (ref. nonclinic)			0.17
Clinic respondent	.53	(0.21, 1.31)	
Age (ref. 60–64)			0.11
65–74	.37*	(0.15, 0.93)	
75 and older	.77	(0.22, 2.66)	
Sex (ref. female)			0.78
Male	.73	(0.32, 1.65)	
Education level			0.88
(ref. < high school)			
≥ High school	1.25	(0.42, 3.75)	
Insurance (ref. Uninsured)			0.60
Insured	1.05	(0.38, 2.93)	
Living with (ref. alone)			0.40
Not alone	1.53	(0.50, 4.72)	
High blood pressure (ref. no)			0.01
Yes	6.58*	(1.32, 32.85)	
High cholesterol (ref. no)			0.81
Yes	0.95	(0.41, 2.18)	
Taking insulin (ref. no)			0.07
Yes	2.37	(0.95, 5.89)	
Obese (ref. no)			0.64
Yes	0.58	(0.25, 1.33)	
Able to afford medicines (ref. Yes)			0.24
No	2.99	(0.95, 9.38)	
Able to afford physician visits (ref. yes)			0.84
No	0.61	(0.17, 2.14)	
Received diabetes education (ref. no)			0.07
Yes	0.32*	(0.11, 0.97)	
Intercept	0.10*		
LR χ^2	27.77	(df=15), P value=0.02	
Nagelkerke R ²	0.22		
Correct Prediction Percentage	80.2%		

^aOdds ratio significant at .05 labeled by *.
CI, confidence interval.

The proportion of participants in our study who reported ER use 1 or more times in the past 12 months (24%) was similar to findings in previous studies of multiethnic adult populations with diabetes in the United States.^{31,32} Our findings show that older individuals (ages 65–74) were less likely to use the ER compared to those in the group aged 60–64 years. A previous study of an adult population with type 2 diabetes also found that younger age predicts ER use.³¹ It is possible that people younger than age 65 use the ER more often because they lack Medicare or another form of insurance that would pay for their regular medical needs. Further

research is needed to determine if ER is the main source of care among aging Hispanics with diabetes who live along the border, and how to intervene appropriately (eg, diabetes self-management education, accessibility, affordability) to prevent the over-reliance on ER use among these individuals.

According to our results, hypertension also is associated with ER use. A possible explanation of this finding may be that our study population likely used emergency care because of clinical hypertension-related complications, which is supported by previous research that shows high blood pressure to be associated with diabetes macrovascular complications.³³ Our study also found that participants who were exposed to diabetes education were less likely to use the ER. Previous studies show conflictive results.^{10,34}

Despite being diagnosed with diabetes, an astounding result from our study was that 74% of participants reported not ever having been exposed to a diabetes education program or class. This percentage is much higher compared to the US population 18 years of age and older with diabetes (45%).³⁵ Also, significantly more study participants recruited in a clinical setting or not living in a colonia reported receiving diabetes education compared to those recruited in community settings or residing in a colonia. Further research is needed to examine the role and impact of community health clinics (study recruiting site) in diabetes management, as well as reasons why a lower proportion of colonia residents are exposed to diabetes education compared to those who do not live in these impoverished areas.

This study has limitations, which must be acknowledged. The study design was cross-sectional; therefore, causal inferences cannot be made. In addition, both the dependent and independent variables were measured using a self-report instrument, which could have introduced some level of “same source” biases. Another limitation is that we used a convenience sampling technique with a relative small sample, which may reduce the ability to generalize our findings beyond our study population to Hispanics with similar demographic characteristics. Despite these limitations, this study contributes to the scarce literature on health care utilization in minority populations. To the best of our knowledge, this is the first study to examine factors that influence health care utilization patterns in an aging, underserved Hispanic population with type 2 diabetes in the Texas–Mexico border region—an area in which disparities in diabetes rates, preventive practices, and access to care are of great concern.

Conclusion

This study found that aging Hispanics with type 2 diabetes who live in impoverished areas at the Texas–Mexico border visit the physician frequently for diabetes-related issues, on average almost 3 times within 6 months. Conversely, the proportion of individuals in this population who seek recommended annual examinations or who are exposed to diabetes education was low compared to national levels. This study also determined that aging, being insured, being able to pay for physician visits, suffering from chronic conditions, and no exposure to diabetes education were significantly associated with health care utilization in this minority group. Findings from this study have implications for public health management practices that seek to improve health

care utilization in aging minorities with chronic diseases. Strategies to accomplish this may include the dissemination of chronic disease and diabetes self-management programs, not only through community health clinics but also at senior centers. Research shows that implementation of these programs in medical and community settings improves health and utilization outcomes and reduces ER use among patients with diabetes.^{36,37} Understanding levels and utilization patterns of health services in underserved minorities disproportionately affected by diabetes could improve preventive practices and quality access to health care, as well as inform health policies directed to this population, all of which can reduce or delay the onset of diabetes complications in border older Hispanics and associated ethnicity-based health disparities.

Author Disclosure Statement

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