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Metabolic syndrome associated with Ischemic Stroke among the Mexican Hispanic Population in the El Paso/Border Region

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Abstract

The Hispanic population carries a disproportionate burden of stroke compared to the non-Hispanic White population. Most studies have been conducted on Caribbean Hispanics, indicating a need to better understand the characteristics of stroke and its prevalence among the Hispanic populations of Mexican descent. In this report, data were collected in the El Paso/US-Mexico border region, where 82% of the population is Mexican Hispanic, through a retrospective study of ischemic stroke from 2005 to 2010. Odds ratios (OR), 95% confidence intervals (CI), logistic regression and multivariate analysis of the odds ratios adjusted for other variables, were used to analyze the effects of various risk factors on ischemic stroke. The metabolic syndrome and its components, specifically hypertension, diabetes, and dyslipidemia appeared to be strongly associated with ischemic stroke in the Mexican Hispanic population. Mexican Hispanic ischemic stroke patients were nearly seven times more likely to have this syndrome, compared to Mexican Hispanic controls from the National Health and Nutrition Examination Survey. Likewise, the patients were nearly forty times more likely to have hypertension and eleven times more likely to have diabetes. Efforts to prevent ischemic stroke and limit its impact in the Mexican Hispanic population should focus on controlling hypertension and diabetes.

Keywords

Metabolic Syndrome; risk factors; Ischemic Stroke; Mexican Hispanic; Epidemiology

Introduction

Stroke remains a major public health burden in the United States. Despite advances in treatment and prevention, stroke has remained a top five cause of mortality since 1935 (1). Recently, in the United States, stroke moved from the third leading cause of mortality to the fourth, but remains a significant cause of mortality (2). In addition to mortality, stroke is the

leading cause of disability in the Western world (3) and is a dramatically increasing in developing countries (4). It is estimated that the health care costs of strokes, between 2005 and 2050, will approach \$2.2 trillion (5).

A body of evidence has emerged for ethnic disparities in stroke incidence, subtype, severity, risk factors and mortality (6-10). The most alarming figures in relation to the stroke are the discrepancies of the burden of mortality, disability and the cost between ethnic groups, specifically among African Americans and Hispanics (11, 12). Among Hispanics, stroke represents 5.1% of all deaths and the projected per capita spending for stroke is \$17,201, second only to African Americans (5); demonstrating that the burden of stroke is higher among Hispanic populations as compared to all others (14). It has also been documented that Hispanics have an earlier age of onset, an overall greater incidence, and a greater recurrence of stroke (15). A possible explanation for this discrepancy is the fact that Hispanics have a higher prevalence of the metabolic syndrome and diabetes mellitus compared to African Americans or non-Hispanic Whites (14).

Most studies have been conducted in Cuban, Dominican, Puerto Rican and South American Hispanic populations and not those of Mexican descent (16). A recent report found significant differences in the frequency of different risk factors, stroke subtypes and severity, and outcomes between Mexican and Caribbean Hispanics, highlighting the heterogeneity of the Hispanic ethnic group (17). Hispanics of Mexican origin are a unique population with different genetics and population dynamics and need to be considered separately from other Hispanic populations (18).

Being situated adjacent to Juarez, Mexico, El Paso is one of the few counties in the United States whose population is primarily Hispanic of Mexican origin. According to the 2010 census, El Paso County had a population of over 800,000 with 651,727 individuals of Hispanic origin, roughly 82% of the population. With these unique population dynamics, the population of El Paso County provides tremendous insight into ischemic stroke characteristics within the Mexican Hispanic population.

Aims

The El Paso Stroke (*ElPasoStroke*) database was established to characterize ischemic stroke among the Mexican Hispanic population in the US-Mexico border area for a better understanding of ethnic differences in risk factors and the association of risk factors with odds of ischemic stroke in the Mexican Hispanic population.

Methods

Study Population

ElPasoStroke is composed of 546 ischemic stroke subjects identified through a retrospective chart review of all subjects with the ICD-9 diagnosis codes of 434.00/.01 (cerebral thrombosis with/without infarction), 434.10/.11 (cerebral embolism with/without infarction), and 434.90/.91 (cerebral artery occlusion, unspecified with/without infarction) from 2005 to 2010 at University Medical Center, El Paso (UMC), the only level one trauma center and the

primary referral hospital in the region. This study has been conducted in accordance with an approved protocol from the institutional review board (IRB) at Texas Tech University Health Sciences Center (TTUHSC). The database was compiled through detailed review of each chart acquired through the ICD-9 search. Charts were reviewed for the following information: demographic information (year of birth, year of admission, gender, and ethnicity), stroke information (type, family history of stroke, and personal history of stroke), comorbid conditions/risk factors [diabetes (including glucose level on admission), hypertension (including blood pressure on admission), dyslipidemia, height and weight, illicit drug use (including type), heart disease (including type), lung disease, tobacco use (including type and duration), and alcohol abuse]. Subjects were excluded based on the following criteria: incomplete medical record; age less than 18 years; traumatic, infectious, hemorrhagic or post-operative stroke etiology; presence of brain tumor; no radiographic evidence of infarct; Hispanic with birthplace outside of the border region (and therefore not of Mexican descent); Asian, Black, or Native American of White origin. Age of onset was calculated by subtracting year of birth from year of admission, without respect for months. BMI was calculated through standard formula (kg/m^2). The metabolic syndrome was defined as the presence of three or more of: central obesity, elevated triglycerides, diminished high-density lipoprotein (HDL), dyslipidemia, systemic hypertension, or elevated fasting glucose (20).

Data Analysis

The prevalence of each of the gathered data-points was calculated, with means, medians, modes and ranges calculated for continuous data, specifically age and BMI. The data were then stratified by ethnicity for Mexican Hispanics and non-Hispanic Whites (with exceptions for age and BMI due to small sample size). Odds ratios (OR) and 95% confidence intervals (CI) were calculated using SAS software comparing Mexican Hispanics and non-Hispanic Whites from the *ElPasoStroke* for family and personal history of stroke, and risk factors for ischemic stroke. The percentage of strokes by ethnicity in the study population was also compared to those ethnicities in the overall El Paso County population using a Chi-Squared statistical test.

Data from the 2007-2008 National Health and Nutrition Examination Survey (*NHANES*) (21) were used as a comparison control group. These data years were chosen to match the average dates of our data collection. Subjects were assigned a random number via a random number generator to more effectively utilize the data. Survey data were used to mimic the accuracy of a patient interview (the source of most information in the medical records) as both are based on recollection, with the exception of age and BMI. In the case that multiple variables were used in *NHANES* for a single *ElPasoStroke* data-point, the subject was counted as having the condition if one or more of the variables was positive. Presence or absence of the metabolic syndrome was calculated in the same manner as *ElPasoStroke*. Alcohol abuse was considered present if subjects consumed more than three drinks per day in the last year. Subject exclusion criteria were followed as in *ElPasoStroke*. In order to match the controls, a 1:2 case to control ratio was used, so the last 1,010 cases (ordered by random number) were chosen from *NHANES* as the control group. Odds ratios and 95% confidence intervals (CI) were calculated for the aforementioned study risk factors. Data

were stratified by age into the following age groups: age from 18 to 49, age 50 to 59, age 60 to 69, and age 70 to 98. ORs and 95% CIs were calculated for each stratified age group, on one occasion there was no subject that met the criteria for the risk factor (in the 70 to 98 age group for illicit drug use in the *NHANES* group) in which case one (1) was substituted for zero (0) to allow for calculation of odds ratios.

Logistic regression and multivariate analysis of the odds ratios adjusted for other variables, was used to analyze the effects of various risk factors on ischemic stroke. In order to perform this analysis, we selected 82 (there were 41 Non-Hispanic White stroke subjects from *EIPasoStroke* and using the same 1:2 ratio of cases : controls as previously used, 82 controls were required for this group) random non-Hispanic White stroke-free *NHANES* subjects, using the method as previously explained, as controls making a total population (n) of 1638 for this analysis. These data were tabulated using the Logistic Procedure in SAS software. From the total population, 6 observations were dropped due to lack of response giving a 1632 total observations used.

Results

Characteristics of EIPasoStroke

Of the 546 cases of stroke that met the inclusion criteria 272 (49.82%) were male, 274 (50.18%) were female, and 505 were Hispanic of Mexican origin (92.49%). Of all the ICD-9 codes gathered, code 434.91 was the most prevalent with 517 (94.69%) subjects assigned. Only 58 (10.62%) subjects had a family history of stroke, with the mother and father being nearly equal (23 and 21, respectively) in prevalence, while 160 (29.30%) subjects had suffered a previous stroke themselves, with 28 having suffered more than one previous stroke. Of the risk factors for stroke assessed, hypertension was the most prevalent with 493 (90.29%) subjects meeting this criterion. Diabetes was the next most prevalent with 304 (55.68%) subjects meeting this criterion. The other risk factors and co-morbidities had the following prevalence counts and percentages, respectively: dyslipidemia (244, 44.69%), obesity (110, 20.15%), illicit drug use (30, 5.49%), heart disease (232, 42.49%), lung disease (19, 3.48%), tobacco use (214, 39.19%), alcohol abuse (119, 21.79%), metabolic syndrome (207, 37.91%). The demographic data for the group are detailed in Table 1. The expected number of strokes over the five year study period in the study population based on the population of El Paso County, stratified by ethnicity, was 467 for Mexican Hispanic and 79 for non-Hispanic White. The Chi-squared statistic calculated to compare the expected number and the actual number returned a two-tailed p value of <.0001.

Mexican Hispanic Group in EIPasoStroke

Since Mexican Hispanic stroke subjects dominate *EIPasoStroke* population (92.49%), most epidemiological characteristics were similar, including gender ratio (49.11/50.89), percentage of family history of stroke (10.69%) with nearly equal mother/father ratio (20/21), percentage of personal history of stroke (30.10%), with 26 subjects having suffered more than one stroke. Likewise, of the risk factors for stroke assessed, hypertension (89.90%) and diabetes (57.62%) were the most prevalent. Other risk factors and co-morbidities had the similar prevalence respectively: dyslipidemia (227, 44.95%), obesity

(104, 20.59%), illicit drug use (26, 5.15%), heart disease (212, 41.98%), lung disease (17, 3.37%), tobacco use (198, 39.21%), alcohol abuse (113, 22.38%), metabolic syndrome (196, 38.81%). The epidemiological and demographic data for the group are detailed in Table 1.

Comparison of EIPasoStroke Ethnic Groups

The ORs for total thirteen risk factors and comorbidities generated by comparing the Mexican Hispanic ischemic stroke group to the non-Hispanic White ischemic stroke group were as follows (95% CI): family history of stroke 1.11 (0.38, 3.23), personal history of stroke 1.78 (0.80, 3.94), male gender 0.68 (0.36, 1.30), diabetes 2.93 (1.48, 5.79), hypertension 0.46 (0.11, 1.95), dyslipidemia 1.15 (0.60, 2.20), obesity 1.51 (0.62, 3.69), illicit drug use 0.50 (0.17, 1.52), heart disease 0.76 (0.40, 1.44), lung disease 0.70 (0.15, 3.05), tobacco use 1.01 (0.52, 1.94), alcohol abuse 1.68 (0.69, 4.10), metabolic syndrome 1.73 (0.85, 3.53). OR (95% CI) for only one risk factor, diabetes, was significant (Table 2).

Comparison between EIPasoStroke Ischemic Stroke and NHANES normal Mexican Hispanics

Evaluating the ORs for all eleven risk factors and co-morbidities of the *EIPasoStroke* Mexican Hispanic ischemic stroke group compared to the *NHANES* Mexican Hispanic stroke-free group identified seven significant risk factors (95% CI): diabetes 11.01 (8.45, 14.35), hypertension 39.70 (28.53, 55.24), dyslipidemia 2.82 (2.24, 3.54), obesity 0.44 (0.34, 0.57), illicit drug use 0.15 (0.10, 0.23), heart disease 15.16 (10.74, 21.40), metabolic syndrome 6.56 (4.95, 8.70) (Table 3).

Stratification by Age

Among the eleven risk factors and co-morbidities examined in the 18 to 49 year old group, the ORs (95% CI) were significant for following six risk factors: diabetes 22.88 (10.98, 47.67), hypertension 52.24 (26.03, 104.84), dyslipidemia 5.14 (2.85, 9.28), illicit drug use 0.48 (0.24, 0.94), heart disease 58.83 (20.72, 167.04), and metabolic syndrome 30.90 (12.48, 76.53).

In the 50 to 59 year old group, the ORs (95% CI) were significant for following five risk factors: diabetes 4.92 (2.91, 8.33), hypertension 13.10 (6.95, 24.69), obesity 0.32 (0.19, 0.55), heart disease 6.35 (3.22, 12.54), and metabolic syndrome 2.25 (1.30, 3.87).

In the 60 to 69 year old group, the ORs (95% CI) were significant for following five risk factors: diabetes 6.86 (4.06, 11.59), hypertension 30.19 (12.50, 72.94), obesity 0.40 (0.24, 0.66), heart disease 5.23 (2.67, 10.23), and metabolic syndrome 4.17 (2.48, 7.02).

In the 70 to 98 year old group, the ORs (95% CI) were significant for following six risk factors: diabetes 2.67 (1.54, 4.61), hypertension 13.59 (6.93, 26.67), obesity 0.37 (0.20, 0.68), heart disease 5.32 (2.84, 9.98), lung disease 0.35 (0.14, 0.87), and alcohol abuse 3.43 (1.29, 9.11) (Table 4).

Logistic Regression and Multivariate Analysis

Of all variables tested, only age, hypertension, heart disease, metabolic syndrome, and Mexican Hispanic ethnicity were jointly significant using this model. Using the results of this model, each year increase in age increases the odds of having an ischemic stroke 1.039 times (1.028, 1.050). Further data demonstrate that the odds of suffering a stroke were 11.83 (8.20, 17.09) times greater with hypertension, 4.77 (3.19, 7.15) times with heart disease, 3.46 (2.26, 5.31) times with the metabolic syndrome, and 1.577 (0.92, 2.71) times for being of Mexican Hispanic origin (although this parameter was not significant) (Table 5).

Discussion

Our results demonstrate the unique characteristics of ischemic stroke within the Mexican Hispanic population of the El Paso border region. The burden of ischemic stroke on the Mexican Hispanic population was significantly higher than expected ($p < .0001$); demonstrating the importance of targeting preventative measures specifically to the Mexican Hispanic population.

Metabolic syndrome may have a greater impact on Mexican Hispanics

Ischemic stroke in the Mexican Hispanic population had a greater recurrence as demonstrated by the higher percentage of subjects with a past history of stroke (30.10% compared to 19.51% in non-Hispanic Whites), although this difference was not statistically significant probably due to the small sample size of non-Hispanic Whites. These findings are consistent with those published from the Brain Attack Surveillance in Corpus Christi (BASIC) dataset (22, 23). Our findings of association of ischemic stroke with diabetes and hypertension are similar with those published from the BASIC study (24), although our study is specifically focused on ischemic stroke. Additional findings from the BASIC study demonstrated some linkage between family history of stroke and certain factors of stroke onset, severity, and outcome (25), but did not compare the prevalence of family history of stroke between ethnic groups. We found that there was no significant contribution of genetic or familial link. Our data illustrate the increased role of diabetes and the metabolic syndrome among Mexican Hispanics (Table 2), making diabetes an important focus for ischemic stroke screening and prevention.

Our results suggest that patients with ischemic stroke were nearly seven times more likely to have the metabolic syndrome, nearly forty times more likely to have hypertension, over eleven times more likely to have diabetes and almost three times more likely to have dyslipidemia (Table 3). These values were especially pronounced when the data were stratified (Table 4), which suggest that these risk factors have the greatest impact on the younger age group (age 18 to 49) whereas their impact declines with advancing age. This demonstrates the vascular instability from these conditions occurs at a far earlier age than would occur without these conditions. This is further demonstrated by the impact of heart disease on ischemic stroke in the younger age group (age 18 to 49), where the odds of ischemic stroke are over 48 times the risk compared to those without heart disease.

It is interesting to note the apparent protective value of obesity on stroke. Curtis *et. al.* suggested that “among patients with chronic disease excess weight is paradoxically associated with a decreased risk of adverse outcomes” (26). This is consistent with other published findings which confirm the presence of the “Obesity Paradox” (27-29). Cumulatively and among those 18 to 59 years of age, illicit drug use was a protective factor; as paradoxical as the obesity findings. This may be due to reporting bias or due to the fact that any illicit drug was considered as drug abuse, as not all illicit drugs have been linked to an increased risk of cardiovascular diseases (30). Alcohol abuse and lung disease were only significant in the 70 to 98 year old age group. This may be due to study artifact or may demonstrate the deleterious effects of alcohol and lung disease (possibly from tobacco) that accumulate over time rather than immediate impact (31). Although moderate alcohol consumption has been linked with a reduced risk of ischemic stroke (32), these findings may suggest that chronic moderate to heavy consumption of alcohol increases the risk of ischemic stroke in Mexican Hispanics, although further research would be necessary. The logistic regression and multivariate analysis shown in Table 5, suggests that Mexican Hispanic ethnicity itself is nearly a significant independent risk factor for ischemic stroke and likely would be with an increased sample size (24).

Limitations

The retrospective nature and the reliance on subjective data found in medical records may be considered a limitation. Some important risk factors for stroke, such as atrial fibrillation, were not included in this study due to missing data caused by diversified clinical attentions. Prevalence parameters defined in this study may be underestimated. Every effort was made to ensure that the data collection was accurate and complete. But these efforts did require assumptions to be made about missing data which could have had an adverse impact on the results. Further, the age ranges and mean ages of the *ElPasoStroke* Mexican Hispanic group and the *NHANES* Mexican Hispanic group were different making the data harder to match, which we tried to overcome with the aforementioned match of gender and age stratification. Further efforts to overcome these differences came through the use of logistic regression and multivariate analysis which allowed us to control for other factors and still demonstrated the impact of hypertension and the metabolic syndrome on the odds of stroke. In addition, a prospective study has been initiated to validate these initial findings.

The potential guidance for future assessment

Based on the results, consideration for more aggressive treatment of hypertension among Mexican Hispanic patients is warranted to lower the risk of ischemic stroke. Additionally, if a patient of Mexican Hispanic origin is found to have the metabolic syndrome but has blood pressures, blood glucose levels, or cholesterol levels below the standard range of treatment, they may be candidates for early pharmacological treatment and have goals lower than the general population in order to reduce the risk of ischemic stroke. These potential guidelines and goals are especially important for those under the age of fifty, as the metabolic syndrome and its risk factors have the greatest negative impact among this age group. This proposed assessment for risk of ischemic stroke is validated by a recent study on ischemic stroke outcomes, indicating that risk-adjusted rates of longer length of stay in hospital were higher among Hispanic and African American stroke patients (12).

Conclusions

The uniqueness of this study, as to the location performed and the population sampled, in addition to the sample size and comprehensive nature of the data are significant strengths. This study has demonstrated that the metabolic syndrome and its components have a significant impact on odds of stroke among the Mexican Hispanic population of the El Paso border region. Efforts to prevent stroke and its associated burdens of disability and mortality should be aimed at the control of hypertension and diabetes, specifically among Mexican Hispanic population.

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Table 1

Summary of *EIPasoStroke* Database

Category	Sub-Category	Summary of <i>EIPasoStroke</i>			
		Entire <i>EIPasoStroke</i> Database Count	Entire <i>EIPasoStroke</i> Database Prevalence	<i>EIPasoStroke</i> Database Count	<i>EIPasoStroke</i> Database Prevalence
Total Cases	Total	546	100.00%	505	100.00%
	Male	272	49.82%	248	49.11%
Gender	Female	274	50.18%	257	50.54%
	Hispanic	505	92.49%		
Ethnicity	White	41	7.51%		
	434.01	11	2.01%		
ICD-9 Code	434.11	14	2.56%		
	434.90	4	0.73%		
Family History	434.91	517	94.69%		
	Total	58	10.62%	54	10.69%
	Mother	23	4.21%		
	Father	21	3.85%		
	Sibling	9	1.65%		
	at least 1	160	29.30%	152	30.10%
Personal History	more than 1	28	5.13%	26	5.15%
	Total	304	55.68%	291	57.62%
Diabetes	Total	493	90.29%	454	89.90%
Hypertension	Total	244	44.69%	227	44.95%
Dyslipidemia	Total	110	20.15%	104	20.59%
Obesity	Total	30	5.49%	26	5.15%
Illicit Drug Use	Total	232	42.49%	212	41.98%
Heart Disease	Total	19	3.48%	17	3.37%
Lung Disease	Total	214	39.19%	198	39.21%
Tobacco Use	Total	119	21.79%	113	22.38%
Alcohol Abuse	Total	207	37.91%	196	38.81%
Metabolic Syndrome	Total				

Summary of EIPasoStroke					
Category	Sub-Category	Entire EIPasoStroke Database		EIPasoStroke Hispanic Group	
		Count	Prevalence	Count	Prevalence
<i>Summary Statistics</i>					
Age	Mean	64.91		64.95	
	Median	65		65	
	Mode	64		64	
	Range	24 to 98		24 to 98	
Body Mass Index	Mean	29		29	
	Median	28		28	
	Mode	31		31	
	Range	15 to 54		18 to 49	

Table 2

Results of *ElPasoStroke* Ethnic Group Comparison

Univariate Analysis of Risk Factors for Ischemic Stroke Between Ethnic Groups of Stroke Subjects within <i>ElPasoStroke</i>	Mexican Hispanic		Non-Hispanic White		OR	95% Confidence Interval	
	505		41			Lower Bound	Upper Bound
	n	%	n	%			
Total							
Male Gender	248	49.11%	24	58.54%	0.683527886	0.36	1.30
Diabetes*	291	57.62%	13	31.71%	2.928828181	1.48	5.79
Hypertension	454	89.90%	39	95.12%	0.456510809	0.11	1.95
Dyslipidemia	227	44.95%	17	41.46%	1.1527719	0.60	2.20
Obesity	104	20.59%	6	14.63%	1.512884456	0.62	3.69
Metabolic Syndrome	196	38.81%	11	26.83%	1.729920565	0.85	3.53
Heart Disease	212	41.98%	20	48.78%	0.759726962	0.40	1.44
Lung Disease	17	3.37%	2	4.88%	0.679303279	0.15	3.05
Tobacco Use	198	39.21%	16	39.02%	1.007736156	0.52	1.94
Alcohol Abuse	113	22.38%	6	14.63%	1.681547619	0.69	4.10
Illicit Drug Use	26	5.15%	4	9.76%	0.502087683	0.17	1.52
Family History of Stroke	54	10.69%	4	9.76%	1.107538803	0.38	3.23
More than One Previous Stroke	152	30.10%	8	19.51%	1.776203966	0.80	3.94
More than Two Previous Strokes	26	5.15%	2	4.88%	1.058455115	0.24	4.63

* Statistically Significant

Table 3
Odds Ratios Comparing *EIPasoStroke* Mexican Hispanic Ischemic Stroke Group to *NHANES* Mexican Stroke-free Group

Univariate Analysis of Risk Factors for Ischemic Stroke in the Mexican Hispanic Population										
	Cases (<i>EIPasoStroke</i>)		Controls (<i>NHANES</i>)			95% Confidence Interval				
	n	%	n	%	OR	Lower Bound	Upper Bound			
Total			505		1010					
Male Gender	248	49.11%	494	48.91%	1.01	0.81	1.25			
Diabetes*	291	57.62%	111	10.99%	11.01	8.45	14.35			
Hypertension*	454	89.90%	185	18.32%	39.70	28.53	55.24			
Dyslipidemia*	227	44.95%	227	22.48%	2.82	2.24	3.54			
Obesity*	104	20.59%	374	37.03%	0.44	0.34	0.57			
Metabolic Syndrome*	196	38.81%	89	8.81%	6.56	4.95	8.70			
Heart Disease*	212	41.98%	46	4.55%	15.16	10.74	21.40			
Lung Disease	17	3.37%	39	3.86%	0.87	0.49	1.55			
Tobacco Use	198	39.21%	372	36.83%	1.11	0.89	1.38			
Alcohol Abuse	113	22.38%	223	22.08%	1.02	0.79	1.32			
Illicit Drug Use*	26	5.15%	265	26.24%	0.15	0.10	0.23			

* Statistically Significant

Table 4
Odds Ratios Stratified by Age Comparing *ElPasoStroke* Mexican Hispanic Ischemic Group to *NHANES* Mexican Hispanic Stroke-free Group

Group	Risk Factors for Ischemic Stroke																		
	Cumulative (n=1515)			18 to 49 (n=682)			50 to 59 (n=275)			60 to 69 (n=282)			70 to 98 (n=271)						
	Odds Ratio	95% CI		Odds Ratio	95% CI		Odds Ratio	95% CI		Odds Ratio	95% CI		Odds Ratio	95% CI					
Diabetes	11.01	8.45	14.35	22.88	*	10.98	47.67	4.92	*	2.91	8.33	6.86	*	4.06	11.59	2.67	*	1.54	4.61
Hypertension	39.70	28.53	55.24	52.24	*	26.03	104.84	13.10	*	6.95	24.69	30.19	*	12.50	72.94	13.59	*	6.93	26.67
Dyslipidemia	2.82	2.24	3.54	5.14	*	2.85	9.28	1.20		0.74	1.95	1.54		0.96	2.46	1.16		0.68	1.98
Obesity	0.44	0.34	0.57	0.80		0.44	1.47	0.32	*	0.19	0.55	0.40	*	0.24	0.66	0.37	*	0.20	0.68
Metabolic Syndrome	6.56	4.95	8.70	30.90	*	12.48	76.53	2.25	*	1.30	3.87	4.17	*	2.48	7.02	1.70		0.94	3.08
Gender	1.01	0.81	1.25	1.05		0.61	1.81	1.12		0.70	1.81	1.11		0.69	1.77	1.18		0.70	2.00
Heart Disease	15.16	10.74	21.40	58.83	*	20.72	167.04	6.35	*	3.22	12.54	5.23	*	2.67	10.23	5.32	*	2.84	9.98
Lung Disease	0.87	0.49	1.55	0.69		0.09	5.33	0.79		0.19	3.39	0.45		0.11	1.77	0.35	*	0.14	0.87
Tobacco Use	1.11	0.89	1.38	0.98		0.53	1.79	0.75		0.46	1.20	1.15		0.71	1.88	0.76		0.45	1.29
Alcohol Abuse	1.02	0.79	1.32	1.57		0.89	2.77	1.81		0.99	3.30	1.41		0.75	2.64	3.43	*	1.29	9.11
Illicit Drug Use	0.15	0.10	0.23	0.48	*	0.24	0.94	0.18	*	0.08	0.39	0.30		0.06	1.45	1.72		0.19	15.64

* Statistically Significant

Table 5

Logistic Regression Analysis comparing *EIPasoStroke* to *NHANES* Stroke-free Group.

Risk Factor	Odds Ratio	95% Confidence Interval	
		Lower Bound	Upper Bound
Age*	1.039	1.028	1.05
Hypertension*	11.83	8.2	17.09
Heart Disease*	4.77	3.19	7.15
Metabolic Syndrome*	3.46	2.26	5.31
Mexican Hispanic Ethnicity	1.577	0.92	2.71

* Statistically Significant