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Prevalence of Diabetes and Metabolic Syndrome in a Migrant Mixtec Population, Baja California, Mexico

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Abstract

This study was conducted to determine the prevalence and correlates of metabolic syndrome (MS) and diabetes among a migrant Mixtec population residing in San Quintin, Baja California, Mexico. A cross-sectional study utilizing data collected during a 2-day clinic in 2008 in a rural farming community with a high prevalence of Mixtec Indians. Interviews and clinical examinations were performed to assess sociodemographic data, medical history and anthropometric measures. Blood samples were obtained to measure glycated hemoglobin, fasting glucose, triglycerides, total cholesterol, HDL and LDL. Of the 107 patients surveyed, 56 % were female and mean age was 38.5 (range: 18–74, SD = 12.6) years. Overall, 41.1 % had MS and 26.2 % had diabetes. Drinking alcohol more than once a week [adjusted OR (AOR) = 16.0, $p = 0.008$] and being literate (AOR = 0.38, $p = 0.035$) were independently associated with MS. Only female gender was significantly associated with diabetes (OR = 3.95, $p = 0.005$). The high prevalence of MS, diabetes and other metabolic abnormalities among migrant farm workers in San Quintin suggest the need for interventions to reduce the risk for these conditions.

Keywords

Metabolic syndrome; Diabetes; Mixtec; Mexico

Background

Metabolic syndrome (MS) is a worldwide health problem. Major health organizations have published guidelines to diagnose the syndrome including the World Health Organization [1], National Cholesterol Education Program Adult Treatment Panel III (ATPIII) [2], the American Heart Association and National Heart, Lung and Blood Institute (AHA/NHLBI) [3], and the International Diabetes Federation (IDF) [4], among others.

Metabolic syndrome is associated with an increased risk of cardiovascular disease (CVD), CVD mortality, all-cause mortality, myocardial infarction and stroke [5, 6]. Even though insulin resistance, central to development of diabetes, is one of the defining criteria for MS in certain guidelines [1], the presence of the MS has been found to be an independent risk factor for developing type 2 diabetes [7, 8].

A recent meta-analysis estimated the prevalence of MS in Latin America to be 24.9 % (range: 18.8–43.3 %), with low HDL cholesterol (62.9 %) and abdominal obesity (45.8 %) being the most frequently occurring MS criteria [9]. Based on ATPIII criteria, the Mexican National Health and Nutrition Survey (ENSANUT2006) found that 36.8 % of Mexico's population has MS [10].

In the United States, the Third National Health and Nutrition Examination Survey (NHANES III) found that Hispanics had the highest MS prevalence (31.9 %) followed by whites (23.8 %), and blacks (21.6 %); however, this survey does not report on American indigenous groups separately [11]. Concurrent with NHANES III, the Strong Heart Study, involving 4,549 Native Americans from 13 tribes, reported a prevalence of 37.7 % in this population [12].

The Mixtec are a precolombian indigenous group that originated in an area called the Mixteca. This region lies in southern Mexico, predominantly in western Oaxaca and adjacent areas of Guerrero and Puebla. It is broken into three ecologically distinct zones: the Mixteca Alta, the Mixteca Baja, and the Mixteca de la Costa [13]. While some Mixtecs worked in the United States as “Braceros” (temporary contract laborers from Mexico who worked primarily in agricultural fields in the United States), this immigration trend ended in 1965. Mixtecs were recruited to Sinaloa in the late 1960s and early 1970s, and to Baja California in the late 1970s as agro-export production became established in Northern Mexico [14]. It is estimated that approximately 25,000 Mixtecs live in Baja California [15].

Previous studies of Mexican indigenous groups have focused primarily on the prevalence of diabetes. Escobedo et al. reported a diabetes prevalence of 8.7 % in Zapotec and 6.9 % in Mixe Indians. Impaired fasting glucose was 9.9, and 4.7 %, respectively [16]. Among Otomi Indians, 4.4 % had diabetes, 7.6 % had hypercholesterolemia, and 26 % had hypertriglyceridemia [17]. To our knowledge, no studies have examined MS and its components or diabetes in a community of migrant farmworkers in northern Mexico, particularly one that is predominantly Mixtec.

Methods

Using medical records from patients attending a two-day long clinic in a single migrant agricultural colonia (neighborhood) in San Quintin, B.C., Mexico, we attempted to estimate the prevalence of MS and diabetes, as well as to identify correlates of both diseases among adults living in the colonia.

Study Setting

Twice annually, a primary school is the setting for a weekend long clinic that provides primary care services for an underserved population. All services and medications are provided free of charge. In October 2008, patients attending the clinic were offered free screening for MS and type-2 diabetes. The clinic is conducted by Viajes Inter-institucional Integracion Docente Asistencial Investigation (VIIDAI), a binational inter-institutional project between two universities in San Diego, CA (University of California San Diego [UCSD] and San Diego State University [SDSU]) and one in Tijuana, Mexico (Universidad Autonoma de Baja California [UABC]). The clinic and ancillary activities involved over 100 students, faculty members and volunteers. The clinic was set in a local primary school in the Colonia on a Saturday and Sunday, when the school was not in session and most residents were not working [18]. Colonia residents were made aware of the clinic by having the schools teachers, administrators and community leaders make announcements to the students, parents and neighbors during the weeks preceding the event.

San Quintin, B.C., Mexico, is located 300 km south of the US-Mexico border on the west coast of the B.C. peninsula. Approximately 30,000–40,000 farm workers reside in the San Quintin Valley, 3,000–5,000 of whom reside in the *colonia* served by the clinic. Lured by jobs in the agricultural export industry, much of the population in the region is comprised of migrants from outside of B.C., primarily the state of Oaxaca.

Data Collection

Patients were interviewed by previously trained medical and public health students using a standardized 31-item questionnaire to obtain demographic, family and personal history, and lifestyle data. Anthropometric data, vital signs and laboratory tests were also taken. Data on patients attending the VIIDAI clinic was entered into an electronic medical record. Two hundred sixteen patients were recorded in the database during the two days. We extracted the records of 107 patients who self-identified as Mixtec, were 18 years of age or older, and had been screened for both MS and diabetes. We reviewed data for completeness on variables studied.

Demographic data included occupation, years living in San Quintin, literacy, and school years completed. Literacy was self-reported as being able to read and write. Family and personal history for diabetes, hypertension, stroke, obesity, coronary artery disease and gestational diabetes were assessed. Lifestyle data included smoking habits, alcohol consumption, and physical activity. Smoking habits included years smoked and cigarettes smoked per day. Alcohol consumption included frequency of use and type of drink preferred.

For physical activity, we used a questionnaire validated in Canada and used previously in a population in Oaxaca [19]. This score was assessed incorporating four variables, each graded from 1 to 4 points, where 1 was the least activity and 4 was the most activity. The score was computed by adding the points for each variable for a maximum score of 16. The variables and levels ordered from least to most activity, respectively, were: (1) type of transportation primarily utilized (automobile, motorcycle, bicycle, walking); (2) primary physical activity level for main occupation (sitting, standing and walking, carrying light load/climbing stairs, heavy work); (3) frequency of playing sports (none or rarely, 2–3 times/month, 1–2 times/week, and >3 times/week); and 4 h/week watching television (>13 h, 8–12 h, 4–7 h and <3 h).

Laboratory tests included fasting blood glucose, glycated hemoglobin (HbA1c), triglycerides, total cholesterol, low-density lipoprotein (LDL), and high-density lipoprotein (HDL) using point-of-care systems. HbA1c was determined through NycoCard HbA1c Reader II (Axis Shield, Oslo, Norway). Triglycerides, total cholesterol, LDL and HDL were determined with CardioChek PA whole blood test system (Polymer Technology Systems, Inc, Indianapolis). All patients were instructed to fast for 8 h before venipuncture. Blood pressure was measured while the subject was seated. Pre-hypertension (systolic 120–139 mmHg or diastolic 80–89 mmHg), stage 1 hypertension (systolic 140–160 mmHg or diastolic 90–100 mmHg), stage 2 hypertension (systolic >160 mmHg or diastolic >100 mmHg), were diagnosed based on the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure VII (JNC VII) guidelines [20]. Diabetes was diagnosed by an HbA1c level $\geq 6.5\%$ or a fasting glucose above 126 mg/dl, and impaired fasting glucose was determined by a fasting glucose ≥ 100 mg/dl according to American Diabetes Association (ADA) guidelines [21]. MS was defined according to the 2004 AHA/NHLBI criteria [3] as having three or more of the following criteria: waist circumference >102 cm in males and >88 cm in females, elevated triglycerides (TG) ≥ 150 mg/dl; reduced HDL-cholesterol <40 mg/dl in males and <50 mg/dl in females; elevated blood pressure as systolic blood pressure (SBP) ≥ 130 mm Hg or diastolic blood pressure (DBP) ≥ 85 mm; impaired fasting glucose ≥ 100 mg/dl [2]. Medication use to treat any one of these conditions (as specified in the AHA/NHLBI guideline) was not considered to define criteria.

Statistical Analysis

Crude prevalence of MS and its components, diabetes, and hypertension were computed. These estimates were also stratified by sex and age group. Continuous variables are reported as means with standard deviation, while categorical values are represented as percentages. Significance level was set at an alpha of <0.05 . Since the dependent variables (MS and diabetes) were binary, factors associated with these variables were identified using Student's *t* tests for continuous variables and Pearson's Chi-square tests for nominal variables. Unadjusted and adjusted odds ratios and confidence intervals were computed using simple and multivariate logistic regression analysis. For multivariate analysis, all variables were considered for inclusion. A backward stepwise model selecting for main effects in the final model was performed. Once a model was determined, individual variables were selectively added and removed to provide a parsimonious model. At each step, likelihood ratio testing

was used to compare nested models until only variables with p -values <0.05 remained in the final model. The statistical analysis was performed using SPSS 17 for Mac. This study used de-identified clinical records and the analysis was determined to be exempt from ethics review by the UCSD Human Research Protections Program.

Results

Medical records from all 107 clinic patients who self-identified as Mixteca were included in this analysis, of which 60 (56 %) were female and their mean age was 38.5 years (SD = 12.69). Demographic, lifestyle, anthropometric and laboratory measures stratified by gender are presented in Table 1. Men were more likely to have finished more school years ($p = 0.012$), smoke ($p < 0.001$), drink alcohol regularly ($p < 0.001$), have a higher weight ($p = 0.004$), height ($p < 0.001$), and BMI ($p = 0.048$). Women were more likely to have a higher HbA1c ($p = 0.027$) and HDL ($p < 0.001$).

Overall, 41.1 % were determined to have MS and 26.2 % to have diabetes. All of the components assessed were more prevalent in men than women (Table 2), except for obesity and diabetes diagnosed by HbA1c criteria; however, diabetes was the only condition that had a statistically significant difference between men and women (12.8 % vs. 36.7, respectively: $p = 0.005$). Low HDL (88.6 %), high triglycerides (75.0 %) and high blood pressure (75.0 %) were the three most commonly observed component measures among patients with MS. Mean value for weight was 68.22 kg, height 1.53 m, BMI 29.11 kg/m², fasting glucose 93.3 mg/dl, systolic blood pressure 128.4 mm Hg, diastolic blood pressure 75.6 mm Hg, waist 93.4 cm, HbA1c 6.3 %, total cholesterol 168.2 mg/dl, triglycerides 190.6 mg/dl, HDL 41.2 mg/dl and LDL 119.6 mg/dl. On average, subjects had 2.3 criteria positive for MS.

In univariate analysis considering socio-demographic, family history, lifestyle and physical activity measures, only consuming alcohol at least once a week was positively associated with MS (OR = 13.7, $p = 0.003$) (Table 3). For diabetes (Table 4), female gender was the only variable positively associated (OR = 3.96, $p = 0.005$). Being literate showed a lower odds ratio for both MS (OR = 0.49, $p = 0.090$) and diabetes (OR = 0.41, $p = 0.053$), even though this was not statistically significant.

On multivariate logistic regression analysis (Table 5), adjusted for gender, MS was found to have an independent positive association with drinking alcohol more than once a week [adjusted OR (AOR) = 16.0, $p = 0.008$] and a negative association with being literate (AOR = 0.38, $p = 0.035$). Additional adjustment for age did not change these findings (data not shown). For diabetes only female gender had a positive association (OR = 3.95, $p = 0.005$).

Discussion

The prevalence of MS in the study population is similar to the general population of Mexico (41.1 vs. 41.6 %), as reported by the ENSANUT2006 [10]. However, compared to data published in a recent meta-analysis on the MS in Latin America, it is 16.2 % higher than the combined population of that study. [9] This emphasizes the need for more directed programs to control the individual conditions of MS in this population.

One study evaluated MS in men from a mixed urban–rural population in Oaxaca, the state from where the majority of our population originated, and found a prevalence similar to ours (41.2 %) [19]. However, the International Diabetes Federation criteria were used in that study, which used a lower cutoff value for abdominal obesity [22]. This makes direct comparisons between the study populations difficult. Other factors limiting direct comparisons are the use of an older population (35–69) and only including males in the previous study [19].

In the present study, diabetes, diagnosed by Hb1Ac levels, was very high (26.2 %). Compared to two other studies of indigenous groups in southern Mexico in Zapotec (8.71 %), Mixe (6.9 %) [16] and Otomi (4.4 %) [17] indigenous groups, our prevalence was much higher. One study of 101 Mixtecs in Oaxaca demonstrated a prevalence of diabetes of only 2 % [23]. These may partly represent the “thrift hypothesis”, as the lower prevalence was reported for ethnic groups still in their territories of origin [24]. A meta-analysis of aboriginal groups concluded that as these groups become more acculturated to Western societies, prevalence of diabetes and other metabolic abnormalities increases, even though this alone cannot account for prevalence higher than that of the dominant society. It further goes on to state that an inherent genetic susceptibility in these groups must exist to account for the higher prevalence [25].

Similar to previous studies examining diabetes in indigenous populations in Mexico, female subjects in the present study had a higher prevalence of diabetes than males. Zapotec females had a 7.1 % ($p = 0.034$) higher prevalence than males and in Mixe Indians the difference was not significant (7.1 vs. 5.7 %, $p = 0.464$) [16]. In the study of Mixtecs in Oaxaca, as the event rate in females was only two and none were observed in males, no significant difference was proven. However, impaired glucose tolerance was observed in 54 % of females compared to 32 % of males ($p = 0.044$) [23].

The high prevalence of diabetes observed in our study is also a concern because diabetes is a risk factor for reactivation of latent tuberculosis infection (LTBI) and a separate study in this same community observed a high prevalence of LTBI (39.8 %, 95 % CI 31.5–48.7 %) using QuantiFERON-TB Gold In-Tube assay [18]. In Orizaba, Veracruz, the rate of tuberculosis was increased 6.8-fold (95 % CI 5.7–8.2, $p < 0.001$) in patients with diabetes, and the risk for reactivation from latent tuberculosis was also 6.8-fold (95 % CI 5.5–8.4 $p < 0.001$) [26]. In border states of southern Texas, where there is a higher rate of tuberculosis than non-border states, diabetes raised the risk of contracting tuberculosis by 82 % (OR = 1.82, 95 % CI 1.57–2.12) [27]. The high prevalence of both LTBI and diabetes in this community creates an even graver public health concern given the increased risk of LTBI reactivation leading to tuberculosis transmission and death from tuberculosis [28–31].

Literacy was found to be associated with a lower prevalence of MS in our study, and marginally associated with a lower prevalence of diabetes. This suggests that programs improving education access in this population could reduce the risk for these metabolic diseases. The relationship of education and MS was explored by Lee et al. in 4341 Korean patients finding an almost 3 times greater risk (95 % CI 1.8–4.6) of MS in patients that did not finish grade school compared to those who graduated from college or university. In the

same study, exercising less than once a week, having a positive family history for MS and smoking more than 20 pack-years were significant associations [32]. In the study of Mixtec men in Oaxaca, a family history of diabetes and hypertension, living in urban rich and poor areas and a low activity level were independently significant for MS [19]. These associations were not present in our study, probably due to a small sample size.

Drinking alcohol once a week was also found in our study to be independently associated with MS, even though a wide confidence interval (2.2–162.0) suggests poor precision of the odds ratio (AOR = 16.0), likely due to the small sample size or possibly residual confounding by unmeasured factors. Alcohol consumption has been inconsistently associated with metabolic syndrome in different populations, and this could be due to alcohol's effects on each individual component of the syndrome, and limitations of studies, which include not taking into account different drinking patterns, not looking at the effects of beverage type, underreporting of alcohol consumption as this is usually self-reported, and not using standardized scales [33]. A study looking at the effect of alcohol consumption in this population taking into consideration these previous limitations is warranted to see if this association is plausible.

Certain limitations should be considered when interpreting these findings. This study was conducted on a convenience sample using medical records from all Mixtec patients who attended a two-day free clinic in their colonia. Since all patients were included, this sample represents the clinic's patient population, but might not represent colonia residents who did not visit the clinic. Thus, subjects might be more likely to have MS than the general population, even though most patients attended for conditions unrelated to MS or its components. Another limitation was that family history and lifestyle measures were based on patient recall, which might have underestimated the prevalence of certain factors, especially regarding family history. Others include small sample size and the use of non-validated surveys to acquire data. Therefore, these results may not be generalizable to the general population of migrant indigenous groups, and more specifically to Mixtecs. Strengths include the use of HbA1c to diagnosis diabetes, as it is not subject to day-to-day variations and reflects the last three months of glucose control [21].

This study demonstrates a high prevalence of MS, diabetes and other metabolic abnormalities in a migrant indigenous population of Mexico. Public health programs must be targeted to these vulnerable populations, especially in younger age groups before these preventable health problems arise. Based on our findings, ensuring a basic education and the ability to read and write should be prioritized in this community, hopefully enabling more success of health education strategies. Also, as these groups are at a higher risk for developing MS and diabetes as they migrate toward a “Westernized” lifestyle, programs that emphasize healthy diets and active lifestyles should be considered.

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Table 1

Demographic, lifestyle, anthropometric and laboratory data

Characteristic ^a	Male (n = 47)	Female (n = 60)	Total (n = 107)	p ^b
<i>Socio-demographic</i>				
Age	40.0 (13.9)	37.3 (11.5)	38.5 (12.6)	0.273
Years residing in San Quintin, B.C.	16.6 (7.8)	15.0 (6.73)	15.7 (7.24)	0.284
Born in Oaxaca	37 (78.7 %)	47 (78.3 %)	84 (78.5 %)	0.961
Speaks an indigenous language	32 (68.1 %)	32 (53.3 %)	64 (59.8 %)	0.122
Literate	36 (76.6 %)	37 (61.7 %)	34 (31.8 %)	0.100
Occupation: field laborer	24 (51.1 %)	22 (36.7 %)	46 (43.0 %)	0.165
Occupation: homemaker	2 (4.3 %)	29 (48.3 %)	31 (29.0 %)	<0.001
Finished school, years	6.3 (5.7)	3.7 (4.9)	4.8 (5.1)	0.012
<i>Lifestyle</i>				
Smokes	13 (27.7 %)	2 (3.3 %)	15 (14.0 %)	<0.001
Smoking, years	9.5 (2.7)	20.0 (0)	10.9 (2.6)	0.172
Smoking, cigarettes/day	6.2 (1.9)	4.5 (0.5)	5.6 (1.6)	0.799
Drinks alcohol regularly	27 (57.4 %)	15 (25.0 %)	41 (38.3 %)	<0.001
Drinks primarily beer	23 (48.9)	13 (21.7)	36 (33.6)	0.642
Activity score	10.0 (3.9)	9.9 (2.5)	9.9 (2.7)	0.802
<i>Clinical</i>				
Weight (kg)	72.3 (10.6)	65.0 (14.0)	68.2 (13.0)	0.004
Height (m)	1.6 (0.1)	1.47 (0.1)	1.53 (0.1)	<0.001
BMI (kg/m ²)	27.9 (4.0)	30.0 (6.0)	29.1 (5.3)	0.048
Waist circumference (cm)	93.3 (9.9)	93.2 (12.7)	93.3 (11.4)	0.964
Systolic blood pressure (mm Hg)	131.7 (17.0)	125.7 (19.7)	128.4 (18.7)	0.100
Diastolic blood pressure (mm Hg)	76.6 (8.7)	75.3 (9.8)	76.7 (9.5)	0.065
<i>Laboratory</i>				
Fasting glucose (mg/dl)	98.2 (27.9)	89.7 (22.1)	93.4 (25.0)	0.081
HbA1c (%)	6.0 (1.1)	6.6 (1.4)	6.3 (1.3)	0.027
Triglycerides (mg/dl)	189.3 (113.1)	151.5 (84.5)	168.1 (99.4)	0.051
Cholesterol (mg/dl)	188.8 (51.5)	191.9 (45.3)	190.6 (47.9)	0.740
HDL (mg/dl)	33.6 (9.9)	47.2 (19.9)	41.2 (17.5)	<0.001
LDL (mg/dl)	125.9 (42.2)	115.4 (37.2)	119.6 (39.5)	0.199

^a Continuous variables are reported as means and have standard deviation in parenthesis. Categorical variables are reported as number of subjects in the group and percentage of the total in parentheses

^b Student's *t* test was used to determine *p* value of continuous variables. Pearson's Chi squared was used for categorical variables. Significant values (*p* < 0.05) are shown in bold text

Table 2

Diagnosis by gender

Diagnosis	Male (%)	Female (%)	Total (%)	<i>p</i> -value ^k
Diabetes (HbA1c) ^a	12.8	36.7	26.2	0.005
Impaired fasting glucose ^b	31.9	16.6	18.7	0.064
Hypertension ^c	31.9	18.3	24.3	0.104
Prehypertension ^d	36.2	35.0	35.5	0.900
Hypertriglyceridemia ^e	53.2	40.0	45.8	0.245
High LDL ^f	38.3	30.0	33.6	0.367
Low HDL ^g	76.6	70.0	73.8	0.516
Obesity ^h	25.5	37.3	32.1	0.161
Overweight ⁱ	53.2	44.1	48.1	0.311
Metabolic syndrome ^j	40.4	41.7	41.1	0.897
Number of criteria positive, mean (SD)	2.3 (1.1)	2.2 (1.2)	2.3 (1.1)	0.790

^a Diabetes was defined as an HbA1c ≥ 6.5 % or fasting glucose ≥ 126 mg/dl

^b Impaired fasting glucose was defined as fasting glucose ≥ 100 mg/dl and <126 mg/dl

^c Hypertension was defined as having a blood pressure ≥ 140/90 mm Hg

^d Prehypertension was defined as having a systolic blood pressure 120-139 or diastolic blood pressure 80-89

^e Hypertriglyceridemia was defined as triglycerides ≥ 150 mg/dl

^f High LDL was defined as LDL-cholesterol ≥ 130 mg/dl

^g Low HDL was defined as HDL-cholesterol <40 mg/dl in males and <50 mg/dl in females

^h Obesity was defined as having a BMI ≥ 30 kg/m²

ⁱ Overweight was defined as having a BMI ≥ 25 kg/m²

^j Metabolic syndrome was defined as having three or more of the following criteria: waist circumference ≥ 102 cm in males and ≥ 88 cm in females, elevated triglycerides (TG) ≥ 150 mg/dl, reduced HDL-cholesterol <40 mg/dl in males and <50 mg/dl in females, elevated blood pressure as systolic blood pressure (SBP) ≥ 130 mm Hg or diastolic blood pressure (DBP) ≥ 85 mm Hg or medical diagnosis of hypertension, impaired fasting glucose ≥ 100 mg/dl or medical diagnosis of diabetes mellitus

^k Pearson's Chi squared test is used for determining *p* values. Significant values (*p* < 0.05) are shown in bold text

Table 3

Correlates for metabolic syndrome

Characteristic	Positive (%)	Negative (%)	OR	CI 95 %	<i>p</i> ^a
<i>Socio-demographic</i>					
Gender: female	56.8	55.6	1.05	0.48-2.29	0.897
Age 38 years	52.3	38.1	1.78	0.81-3.83	0.146
State of birth: Oaxaca	77.3	79.4	0.88	0.34-2.24	0.795
Lives in San Quintin 10 years	90.9	87.3	1.45	0.41-5.16	0.561
Schooling 6 years	34.1	50.8	0.50	0.22-1.11	0.087
Occupation: field laborer	38.6	46.0	0.73	0.33-1.61	0.447
Salary \$2000 pesos	65.9	69.8	0.83	0.36-1.90	0.667
Speaks indigenous language	56.8	61.9	0.81	0.37-1.77	0.597
Literate	59.1	74.6	0.49	0.21-1.12	0.090
<i>Family history</i>					
Hypertension	15.9	17.5	0.89	0.31-2.52	0.833
Diabetes	15.9	23.8	0.60	0.22-1.63	0.320
Stroke	2.3	11.1	0.18	0.02-1.57	0.087
Obesity	31.8	30.2	1.08	0.47-2.48	0.855
Coronary artery disease	4.5	12.7	0.32	0.06-1.62	0.154
<i>Lifestyle</i>					
Smoking	11.4	17.5	0.60	0.19-1.88	0.384
Smoking 10 years	9.1	4.8	2.00	0.42-9.41	0.373
Smoking 5 cigarettes/day	7.1	6.3	0.70	0.12-4.01	0.690
Drinks alcohol at least once a week	18.2	1.6	13.7	1.65-114.6	0.003
<i>Physical activity</i>					
Uses primarily motorized vehicles for transportation	43.2	50.8	0.73	0.33-1.59	0.438
Practices sports 1/week	93.2	82.5	2.89	0.75-11.0	0.108
Watches television > 3 h a week	61.4	58.7	1.11	0.50-2.45	0.785
Physical activity score 7 (low)	18.2	19.0	0.94	0.35-2.54	0.910

OR odds ratio, CI confidence interval

^aPearson's Chi squared test is used for *p* values. Significant values (*p* < 0.05) are shown in bold text

Table 4

Correlates for diabetes mellitus

Characteristic	Positive (%)	Negative (%)	OR	CI 95 %	<i>p</i> ^a
<i>Socio-demographic</i>					
Gender: female	78.6	48.1	3.96	1.45-10.81	0.005
Age 38 years	42.9	44.3	0.94	0.39-2.25	0.895
State of birth: Oaxaca	77.3	79.4	0.76	0.27-2.10	0.599
Lives in San Quintin 10 years	96.4	86.1	4.36	0.53-35.4	0.136
Schooling 6 years	32.1	48.1	0.51	0.20-1.26	0.144
Occupation: field laborer	46.4	41.8	1.20	0.50-2.87	0.669
Salary \$2000 pesos	67.9	68.4	0.97	0.38-2.46	0.961
Speaks indigenous language	57.1	60.8	0.86	0.35-2.06	0.737
Literate	53.6	73.4	0.41	0.17-1.02	0.053
<i>Family history</i>					
Hypertension	25.0	13.9	2.06	0.70-5.98	0.178
Diabetes	14.3	22.8	0.56	0.17-1.84	0.339
Stroke	7.1	7.6	0.93	0.17-4.93	0.938
Obesity	21.4	34.2	0.52	0.19-1.45	0.209
Coronary artery disease	10.7	8.9	1.23	0.29-5.14	0.772
<i>Lifestyle</i>					
Smoking	10.7	16.5	0.60	0.16-2.32	0.464
Smoking 10 years	7.1	6.3	1.13	0.20-6.22	0.881
Smoking 5 cigarettes/day	0.0	7.6	1.38	1.22-1.56	0.133
Drinks alcohol at least once a week	10.7	7.6	1.46	0.34-6.27	0.609
<i>Physical activity</i>					
Uses primarily motorized vehicles for transportation	35.7	51.9	0.51	0.21-1.25	0.141
Practices sports 1/week	92.9	84.8	2.32	0.48-11.1	0.278
Watches television > 3 h a week	50.0	63.3	0.58	0.24-1.38	0.218
Physical activity score 7 (low)	21.4	17.7	1.26	0.43-3.69	0.665

OR odds ratio, CI confidence interval

^aPearson's Chi squared test is used for *p* values. Significant values (*p* < 0.05) are shown in bold text

Table 5

Multivariate analysis of metabolic syndrome

Characteristic	Adjusted OR ^a	95 % CI	<i>p</i>
Drinks alcohol > 1/week	16.00	2.20-162.0	0.008
Literate	0.39	0.16-0.94	0.035

OR odds ratio, *CI* confidence interval^a All variables are adjusted for the other variables in the table and gender by multivariate logistic regression analysis