PREVALENCE OF OBESITY AND ASSOCIATED CO-MORBID CONDITIONS IN A POPULATION-BASED SAMPLE OF PRIMARILY URBAN MEXICAN AMERICANS

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Objective: To estimate the prevalence and risk factors of obesity in a sample of primarily urban Mexican Americans (the fastest growing segment of the US population), and to examine the association between obesity and co-morbid conditions.

Methods: Subjects were participants from a cross-sectional, population-based prevalence study. Data were collected on 6038 non-institutionalized self-identified Latinos of primarily Mexican American ancestry age ≥40 years from six census tracts in Los Angeles County, California. Obesity was defined having a body mass index ≥30.0 kg/m^2.

Results: The overall prevalence of obesity was 50% (females 54% vs males 43%, $P<.0001$). Stepwise logistic regression analyses revealed that obesity was positively associated with being a former smoker (OR 1.5, $P=.0009$), being unemployed (OR 1.5, $P<.0001$), and with female sex (OR 1.3, $P=.02$). Obesity was negatively associated with being single or divorced (OR .8, $P=.014$), being a current smoker (OR .6, $P<.0001$), and with age ≥70 years (OR .4, $P<.0001$). After adjusting for sex and age, obesity was significantly associated with the following systemic co-morbidities: hypertension, heart failure, arthritis, diabetes, angina, back pain, and asthma ($P<.01$).

Conclusion: Because of the high prevalence of obesity and its associated systemic co-morbidities, an evaluation of current intervention programs is needed to determine the most effective approach to help decrease the prevalence of obesity and the risk of associated co-morbidities in this the fastest growing segment of the US population. (*Ethn Dis*. 2006;16:362–369)

Key Words: Body Mass Index, Mexican American Latinos, Obesity, Waist Circumference

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INTRODUCTION

Obesity, relative to normal weight, is associated with medical conditions such as type 2 diabetes mellitus, gallbladder disease, coronary heart disease, high blood pressure, osteoarthritis, and certain types of cancer.[1–6] In addition, obesity increases the risk of death from any cause for both men and women.[7,8] The healthcare costs related to obesity have been estimated for several countries: in the United States the direct costs of obesity are higher (7% of the total US healthcare cost) than other countries in the developed world, including France and Australia (2%) and the Netherlands (4%).[9–11] Recently, Sturm et al compared the dollar costs for inpatient and ambulatory care in persons with obesity to those individuals who smoke and drink and to aging adults. They reported that obesity was associated with a 36% increase in both inpatient and outpatient spending and with a 77% increase in medications, compared with a 21% increase in inpatient and outpatient spending and a 28% increase in medications for current smokers.[12] Sturm et al also reported a stronger association between obesity and chronic medical conditions (such as diabetes, cancer, or heart disease) than between smoking and these same conditions.

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When stratified by ethnicity, prevalence in Mexican Americans was higher (34%) than that seen in non-Hispanic Whites (28.7%) (NHANES 1999–2000).[13]

Data from the National Health and Nutrition Examination Survey (NHANES 1999–2000), a nationally represented sample of the United States population, revealed that the prevalence of obesity among adults continues to increase dramatically, with higher prevalence among Mexican Americans compared to non-Hispanic Whites.[13–16] The age-adjusted prevalence of obesity in adults age ≥20 in the United States increased overall from 23% (NHANES III, 1988–1994) to 31% (NHANES 1999–2000).[14–16] When stratified by ethnicity, prevalence in Mexican Americans was higher (34%) than that seen in non-Hispanic Whites (28.7%) (NHANES 1999–2000).[13] This continuing increase in obesity has not only become a major public health issue but also a challenge facing health professionals.

As an ancillary study of the Los Angeles Latino Eye Study (LALES), a population-based prevalence study of general health and eye disease among primarily noninstitutionalized adult Mexican Americans age ≥40 years living in the city of La Puente, in Los Angeles County, we examined the prevalence of obesity, associated risk

factors, and obesity-related health conditions.

METHODS

Study Cohort

The study cohort consisted of primarily self-identified Mexican Americans, age ≥40 years, living in the city of La Puente, California. Details of the study design, sampling plan, and baseline data are reported elsewhere.[17] In brief, after identifying and enumerating all dwelling units within six census tracts in La Puente, a door-to-door census of all residents was conducted. If a resident was eligible (age ≥40 years at the time of the census and a self-identified Mexican American), they were informed of the study and invited to participate in both a home interview and a clinic examination. Demographic and socioeconomic characteristics of Mexican Americans in the six census tracts of La Puente were similar to those of the Mexican American population in Los Angeles County, California, and in the United States.[17] The study protocol was approved by the institutional review board at the University of Southern California and followed the recommendations of the Declaration of Helsinki for research involving human subjects.

Demographic and Clinical Data

After informed consent was obtained from the participants, an in-home interview was conducted to obtain demographic factors (age, sex, Mexican American ancestry, acculturation, education, employment status, income level, insurance status), information regarding self-reported history of medical conditions (including diabetes, hypertension, history of any ocular disease/condition, number of co-morbidities), and risk factors (smoking and alcohol consumption). Acculturation was measured through the Cuellar nine-item acculturation scale.[18] This scale is a summary of three subscales: preferred language for reading and writing, preferred language for thinking and speaking, and ethnic identity, ranging from one (lowest acculturation) to five (highest acculturation). The number of co-morbid medical conditions was the sum of a list of 13 self-reported medical conditions including diabetes, arthritis, stroke/brain hemorrhage, high blood pressure, angina, heart attack, heart failure, asthma, skin cancer, other cancer, back problems, hearing problems, and other major health problems. Co-morbidities were classified as categoric (yes/no) to the question, ''has your doctor ever told you, you had the following medical conditions?''

The participants were then invited to complete a clinical examination at the local examination center that included measurements of body weight, height, and waist circumference.[19] Measurements were performed by trained technicians according to a standardized protocol at the LALES local examination center. Before measurements for weight, height, waist, and hip circumference were taken, the participant was asked to remove excess clothing, pocket items, and shoes. The participant was asked to stand straight and tall on the scale platform. The height lever was placed touching the crown of the participant's head, and measurements were read to the nearest .5 cm. Weight was measured to the nearest .1 kg (Detecto Scale, Webb City, Mo). A nonstretchable tape measure was used to measure waist and hip circumference. Waist circumference was measured at the smallest area below the rib cage and above the umbilicus. Hip circumference was measured at the level of the largest extension of the buttocks. The Detecto Scale was periodically checked to ensure the scale was reading accurately. Periodic repeated measurements were taken by a second technician to measure variability and reliability (quality control analyses revealed excellent reliability: r=.93–.99 and P<.0001).

For this study, participants with body mass index (BMI) measurements (n=6038) were defined as those individuals who were given both the in-home questionnaire and clinical examination and had anthropometric measurements completed. Participants with no BMI measurements (n=104) were those individuals who were given the in-home questionnaire, came in for the clinical examination, but refused to have the anthropometric measurements done.

Outcome Measures

Body mass index (BMI) was defined as weight (in kilograms) divided by the square of the height in meters (kg/m^2). To assess obesity in our study population, we used the classification categories defined by the National Heart, Lung, and Blood Institute, the National Institutes of Heath, and the National Institute of Diabetes and Digestive and Kidney Diseases. Body mass index (BMI) categories were defined as: underweight (<18.5 kg/m^2), normal weight (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2) and obese (≥30.0 kg/m^2).[1,2]

Waist circumference measurements were stratified into two sex-specific groups with cut points of 102 cm for males and 88 cm for females, as recommended by the National Heart, Lung, and Blood Institute panel for clinical guidelines.[1,2]

Statistical Analyses

To ascertain any participation bias, we contrasted the distribution of demographic variables between participants with BMI measurements and participants with no BMI measurements by using chi-square procedures for categoric variables and the Student t test for continuous variables. Sex- and age-specific prevalence of obesity were then calculated. Chi-square analyses were used to determine the association of BMI categories and waist circumference categories. Univariate and stepwise logistic regression analyses were used to

determine the relative risk of being obese compared to normal weight for each of the demographic variables (sex, age group, country of birth, marital status, employment status, smoking/drinking, income level, and acculturation). In addition, each self-reported co-morbid condition was used as a dependent variable (yes/no) in the logistic regression model to look at the association of obesity with each medical condition relative to normal weight, after adjusting for sex and age. All statistical testing was conducted at $P<.05$ significance level with SAS (SAS Institute, Cary, NC).

RESULTS

Description of Study Cohort

Of 7789 individuals who were eligible for LALES, 6038 (78%) completed an in-home questionnaire, a clinical examination, and had anthropometric measurements taken at the LALES local examination center (participants with BMI measurements). The average age (± standard deviation) was 54.8 (± 10.9) years, and most participants (58%) were female (Table 1). Both groups of participants, with and without BMI measurements, were similar with regard to marital status, education, income level, and alcohol consumption. When compared with participants who did not have BMI measurements, those that had complete data were slightly younger, were more likely to be born outside the United States, were more likely to be employed, were more likely to be less acculturated, were less likely to smoke, had fewer comorbidities, and were less likely to have health insurance ($P<.05$) (Table 1).

Prevalence of Obesity

The overall prevalence of obesity based on BMI categories in our cohort were 50% obese, 39% overweight, 11% normal weight, and <1% underweight (Table 2). Significant sex and age differences were found. Overall, more females (54%) than males (43%) were obese ($P<.0001$), and the prevalence of obesity was greatest in participants 50–69 years (52%) as compared to the younger (40–49 years) or older (≥70 years) participants ($P<.0001$). In Mexican American females, the prevalence of obesity was greatest in the 50- and 60-year-old age groups (57%); prevalence of obesity among male Mexican Americans was higher in the younger age group (40-year-olds) (44%). In addition, 2465 (70%) of the total females had a waist circumference >88 cm. Of those, 72% were classified as obese ($P<.01$). Of the total 2506 males with waist circumference measurements, 1000 (40%) had a waist circumference >102 cm. Of those, 818 (82%) were classified as obese ($P<.01$) (Table 2).

Demographic Predictors of Obesity

Univariate logistic regression analyses revealed that the risk of being obese (relative to normal weight) was greater for females, 50-year-olds, unemployed, and ex-smokers. Those who were older (≥70 years), were not married, had more education, or were a current smoker were less likely to be obese (Table 3a). When all significant variables were entered into a stepwise logistic model, we found that female sex, being unemployed, and being an ex-smoker were independent significant risk factors for being obese ($P<.05$) (Table 3b). Factors associated with a lower risk of being obese were older age (≥70 years), not being married, and being a current smoker ($P<.02$).

Risk factors associated with obesity were also found significantly associated with being overweight (BMI 25–29 kg/m^2) (results not shown), except for sex; whereas females were more obese and males were more likely to be overweight (odds ratio 1.4, 95% confidence interval 1.1–1.9). Other potential risk factors not found significantly associated with obesity were acculturation, level of income, birthplace, alcohol consumption, and health insurance.

The prevalence of obesity (50%) observed in this study is greater than that previously reported for Mexican Americans (34%) in NHANES (1999–2000).[13]

Medical Conditions Associated with Obesity

The most significant self-reported co-morbid conditions associated with obesity in our cohort were hypertension, heart failure, arthritis, angina, diabetes, back pain, and asthma (relative risk 2.8–1.3, $P<.01$, after adjusting for age and sex) (Table 4).

DISCUSSION

Prevalence of Obesity

The prevalence of obesity (50%) observed in this study is greater than that previously reported for Mexican Americans (34%) in NHANES (1999–2000).[13] For a better comparison between the LALES cohort and the NHANES study, BMI data from the NHANES (2001–2002)[14] website was used to estimate the prevalence rates on those age ≥40 years who were Mexican American. The estimated prevalence was 35%. This greater prevalence noted in our cohort may suggest a geographic difference between both cohorts. Thus, Mexican Americans living in Los Angeles may have different lifestyles that contribute to the higher rates of obesity.

Nonetheless, both studies revealed a higher prevalence of obesity among females in the age group 50–59 years, which suggests that women tend to gain more weight after menopause and thus should be targeted for preventive mea-

Table 1. Demographic characteristics of adult Mexican Americans age ≥40 years in LALES (2000–2003)

Demographic Variables	Participants With BMI* (*N*=6038)	Participants With no BMI* (*N*=104)	*P* value†
Sex: female	3531 (58%)‡	52 (50%)	.08
Age (years)	54.8 (± 10.9)§	59.7 (± 12.9)§	.0002
40–49	2331 (39%)	32 (31%)	<.0001
50–59	1836 (30%)	17 (16%)	
60–69	1165 (19%)	30 (29%)	
≥70	706 (12%)	25 (24%)	
Birthplace			<.0001
United States	1427 (24%)	45 (44%)	
Other	4601 (76%)	58 (56%)	
Mexican American ancestry	5708 (95%)	98 (95%)	.84
Marital status			.32
Married	4169 (69%)	66 (65%)	
Other	1851 (31%)	36 (35%)	
Job status			.02
Employed	2947 (49%)	39 (38%)	
Unemployed/retired	3069 (51%)	64 (62%)	
Education			.24
0–11 years	4019 (67%)	63 (61%)	
≥High school	2009 (33%)	40 (39%)	
Income: <$20,000	2680 (51%)	50 (59%)	.16
Health insurance	3887 (65%)	80 (78%)	.006
Smoking status			.02
Current	833 (14%)	13 (13%)	
Former	1458 (24%)	37 (36%)	
Never	3711 (62%)	53 (51%)	
Alcohol consumption			.08
Regular	675 (11%)	6 (6%)	
Former or occasional	2993 (50%)	61 (59%)	
Never	2360 (39%)	36 (35%)	
Acculturation			.0002
Low (<1.9)	4037 (67%)	51 (50%)	
High (≥1.9)	1991 (33%)	52 (50%)	
Number of co-morbidities‖			<.0001
0	1954 (32%)	17 (17%)	
1	1617 (27%)	23 (22%)	
≥2	2457 (41%)	63 (61%)	
Waist circumference (cm)¶			
Males	100.7 (± 11.8)§	—	
Females	96.2 (± 14.4)		
Waist-hip ratio¶		—	
Males	.97 (± .06)§		
Females	.89 (±.08)		

Note: data not available: birthplace (11), Mexican American ancestry (11), job (23), marital status (20), education (11), smoking (37), alcohol (11), insurance (18), income (808), acculturation (11), co-morbidities (11).

* Participants with BMI: participants completing an in-home questionnaire, a clinical examination, and anthropometric measurements. Participants with no BMI: participants completing an in-home questionnaire and clinical examination, but no anthropometric measurements.

† Chi-square test for categorical variables and Student *t* test for continuous variables.

‡ Frequency (column percent).

§ Mean (± standard deviation).

‖ Comorbidities were the sum of the following medical conditions: arthritis, diabetes, back pain, hypertension, deafness, asthma, angina, other cancers, heart disease, stroke, heart failure, skin cancer.

¶ Waist and hip circumference data not available for participants without BMI data.

LALES=Los Angeles Latino Eye Study; BMI=body mass index.

Table 2. Age- and sex-specific prevalence of obesity* and waist circumference categories, LALES (2000–2003)

	All Participants (n=6038)	Females (n=3531)	Males (n=2507)
Overall	2997 (49.6%)	1922 (54.4%)	1075 (42.9%)
Age groups			
40–49	1151 (49.4%)	725 (53.3%)	426 (43.9%)
50–59	945 (51.5%)	611 (56.9%)	334 (43.8%)
60–69	600 (51.5%)	396 (57.1%)	204 (43.3%)
≥70	301 (42.6%)	190 (47.0%)	111 (36.7%)
Waist circumference distribution†	**All Participants (n=6034)**	**Females (n=3528)**	**Males (n=2506)**
High risk	3465 (57.4%)	2465 (69.9%)	1000 (39.9%)
Low risk	2569 (42.6%)	1063 (30.1%)	1506 (60.1%)

* Obesity is defined as BMI ≥30 kg/m^2.
Chi-square procedure; obesity was statistically associated with sex (P<.0001) and age (P<.0001).
† For all participants: high-risk group=males >102 cm and females >88 cm. Low-risk group=males ≤102 cm and females ≤88 cm. Waist circumference was significantly associated with obesity (P<.05), when compared with the normal-weight group.

sures before reaching that stage. Mexican American males in LALES also had a slightly greater prevalence of obesity (43.8%) at age 50–59 years; similarly, males in NHANES (2001–2002) also had greater (36.9%) prevalence rates in the 50- to 59-year-old age group. Again both studies report similar trends.

NHANES reports a continuing increase in the prevalence of overweight and obesity among women, especially in African Americans and in Mexican Americans, compared to NHANES III (1988–1994). In addition, Arroyo et al[20] reported that 38% of their sample (consisting of urban Mexicans living in Mexico) was classified as pre-obese and 21% as obese. Though their cohort consisted of a younger group starting at age 20 years, their findings were consistent in that obesity rates were higher in females (25.1%) than in males (14.9%) among the Mexican population, and <50% overall were of normal weight. The LALES study confirms that obesity prevalence among Mexican Americans living in Los Angeles is of considerable public health importance.

Table 3a. Odds ratio for obesity associated with demographic characteristics, LALES (2000–2003)

Demographic Variables	Odds Ratio	95% CI†	P value*
Univariate Logistic Regression Analyses			
Sex			
Male	1.0	—	
Female	1.3	1.1–1.6	.001
Age group			
40–49	1.0	—	
50–59	1.3	1.1–1.6	.009
60–69	1.2	.9–1.6	.09
≥70	.5	.4–.7	<.0001
Marital status			
Married	1.0	—	
Single/divorced	.7	.6–.9	.001
Employment status			
Employed	1.0	—	
Not employed	1.2	1.0–1.4	.02
Education			
0–11 years	1.0	—	
≥High school	.8	.7–.9	.04
Smoking status			
Never	1.0	—	
Former	1.3	1.1–1.6	.01
Current	.5	.4–.7	<.0001

* Univariate logistic regression analyses. Note: no association was found for income level, birthplace, acculturation, alcohol consumption, and health insurance status and obesity.
† 95% confidence interval.

Waist Circumference and Obesity

Our results also demonstrated that more than one half of the women in LALES had a waist circumference >88 cm and were obese, a health category associated with metabolic complications and with a higher risk of illness and death.[1,21,22] One study[23] reported that prevalence of metabolic syndrome is more common among Mexican Americans than in other ethnic groups. Thus, individuals with metabolic syndrome are more likely than others to have increased risk of death from all causes, cardiovascular disease in particular.

Women and Obesity

More obesity among women can probably be attributed to biological factors such as menopause,[24] but environmental and cultural factors (or cultural beliefs) may also contribute.

Table 3b. Independent risk indicators associated with obesity, LALES (2000–2003)

Demographic Variables	Odds Ratio	95% CI†	*P* value*
Stepwise Logistic Regression Analyses‡			
Age group			
50–59	1.2	1.0–1.4	0.5
70	.4	.3–.5	<.0001
Sex			
Female	1.3	1.0–1.5	.02
Not employed	1.5	1.2–1.8	<.0001
Marital status			
Single/divorced	.8	.6–.9	.014
Smoking status			
Current	.6	.5–.7	<.0001
Former	1.5	1.2–1.8	.0009

* Stepwise logistic regression analyses. Note: Only significant variables (≤.05) from the univariate analyses were entered into the stepwise logistic model.
† 95% confidence interval.
‡ Only significant groups were reported.

For instance, Mexican American women are more likely to be homebound since they are expected to take care of children and perform household chores and are less likely to engage in moderate-to-high physical activity. Moreover, Johnsen et al[25] reported that cultural attitude might explain a greater proportion of the variance in obesity. For instance, Mexican American females may view being overweight as more compatible with feminine attractiveness than do non-Hispanic White women. Pawsen et al[26] explained that Mexican American females expressed that mild or moderate forms of obesity reflect tranquility, health, and freedom from life's problems. Hence, Johnsen et al[25] reported an association with acculturation and stereotypes. More acculturated women reacted less positively toward one who is overweight, whereas the converse held true for less acculturated women. This finding may in part explain the high prevalence of obesity observed in LALES since most women in the study (67%) were less acculturated. Though acculturation was not significantly associated with obesity in our cohort, those with a higher education were significantly less likely to be obese. Because the life expectancy of women in the United States is approaching 80 years, implementing preventive measures for obesity will ensure a healthy population of women of all ages.

Physical Activity and Obesity

Physical activity plays an important role in obesity as well. But because we did not collect data on physical activity, we cannot know how physically active Mexican Americans are in LALES. However, other studies[27,28] have reported that physical activity is less common among individuals with lower levels of education compared to those with higher education. In addition, studies conducted in older women of color[29] have reported that environmental and psychological factors were associated with lower levels of physical activity among women. For example, beliefs that places to exercise were too far away, feeling fatigued by exercise, fear of walking alone, and the belief that exercise is tiring and hard work have all been associated with sedentary behavior in older Hispanic women, as well as the lack of time, which has been the most common

Table 4. Relative risk of self-reported co-morbidities associated with obesity, LALES (2000–2003)

Co-morbidity§	Self-Reported Prevalence *n* (%)	Relative Risk‡	95% CI†	*P* value*
Hypertension	1858 (30%)	2.8	2.2–3.4	<.0001
Heart failure	184 (3%)	2.1	1.2–3.6	.005
Arthritis	1568 (26%)	1.9	1.6–2.4	<.0001
Diabetes	1056 (17%)	1.9	1.5–2.4	<.0001
Angina	224 (4%)	1.8	1.1–2.8	.0005
Back pain	1225 (20%)	1.5	1.2–1.9	<.0001
Asthma	399 (6%)	1.3	1.0–1.9	.003
Deafness	716 (12%)	1.1	.8–1.4	.81
Heart disease	201 (3%)	1.1	.7–1.7	.27
Other cancer	198 (3%)	1.0	.6–1.7	.95
Stroke	200 (3%)	.8	.5–1.4	.86
Skin cancer	58 (1%)	.7	.3–1.5	.49

* Logistic regression analyses, adjusted for age and sex.
† 95% confidence interval.
‡ Reference group: normal weight group.
§ Co-morbidities were defined as yes/no to 'ever been told by a physician if had the disease in question.'

barrier to physical activity reported. Family issues and community obligations were often cited as obstacles to exercise participation, and care-giving duties were also a significant barrier to physical activity. In addition, not having family support may also lead to not being physically active.

Studies that have evaluated obesity and physical activity in relation to certain types of cancer, diabetes, and total mortality have found that 14%–23% of the total mortality in the United States is caused by sedentary lifestyles and obesity.[27,28] Educational programs that are culturally sensitive or give community support are needed to help emphasize the need for exercise within Mexican American communities.

Diet and Obesity

Another factor to consider is diet. Dixon[30] reported that Mexican Americans who were born in Mexico then migrated to the United States have a lower BMI than Mexican Americans born in the United States. This finding demonstrates that the diet consumed in the United States may be higher in fat than that consumed in Mexico. Similarly, studies[31–33] have pointed out that in the United States, where food availability and portion size are not limited, fast food restaurants are abundant, and sedentary lifestyles are common, obesity and obesity-related health conditions will continue to increase.

Risk Factors

Female sex and age (50–59 years) are associated with more obesity; our study also revealed that Mexican Americans who are unemployed and are former smokers are more likely to be obese, whereas those who are single, have a higher education, and are current smokers are less likely to be obese; these results are similar to what has been reported in the Behavioral Risk Factor Surveillance System, 2000 (BRFSS), a random-digit telephone survey conducted in all states.[16] Perhaps those who are unemployed tend to be less active and thus more likely to gain weight. Former smokers may have an increase in appetite and thus more likely to gain weight. Alternatively, the lower rate of obesity observed in the older age group may be due to a survivor effect—higher mortality in older Latinos who are obese compared to those who survived.

Co-morbidities and Obesity

The associations between obesity and co-morbid conditions in our study were supported by results of other studies.[34] Obesity was significantly associated with hypertension, heart failure, arthritis, angina, diabetes, and back pain. Once again, this finding emphasizes the importance of preventive services to help control for increasing morbidities and mortalities associated with obesity.

Public Awareness and Obesity

Lack of awareness about the health consequences of obesity may also add to its high prevalence in the Mexican American population. The high percentage of Mexican Americans with lower levels of education may suggest a need for education and awareness about co-morbid conditions associated with obesity.

Study Limitations

Our study had some limitations. First, we did not collect dietary and physical activity data from the participants; without this information, we cannot make appropriate recommendations about diet or physical activity changes in this population. A second limitation was the age inclusion criteria. Because we only collected data on participants $\geq$40 years of age, we cannot draw conclusions about the prevalence of obesity and its associations with medical conditions in younger age groups. However, this study makes an important point that without educational intervention, Mexican Americans in the 40-, 50-, and 60-year age groups are more likely to be obese and thus are more likely to be at risk for medical complications.

CONCLUSION

The prevalence of obesity among Mexican Americans in Los Angeles is higher than previously reported. Further followup and evaluation of current intervention programs is warranted to determine the most effective and appropriate programs needed in the communities to help decrease the prevalence of obesity and obesity-related health conditions observed in this population.

Unless affordable and effective weight-reducing programs are implemented, the high prevalence of obesity will continue to pose a problem to public health. Obesity can no longer be addressed by a one-to-one intervention; a broad societal effort is required, including community, school, and work-related programs to help reduce obesity and its associated co-morbid conditions.

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Design concept of study: Torres
Acquisition of data: Torres, Azen, Varma
Data analysis interpretation: Torres, Azen, Varma
Manuscript draft: Torres, Azen, Varma
Statistical expertise: Torres, Azen, Varma
Acquisition of funding: Varma
Administrative, technical, or material assistance: Varma
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APPENDIX

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