Health Disparities Among Mexican American Women Aged 15–44 Years: National Health and Nutrition Examination Survey, 1999–2004

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Objectives. We analyzed the health of Mexican American women aged 15 to 44 years, by generation and language preference, to guide planning for reproductive health services in this growing population.

Methods. We used personal interview and medical examination data from the 1999 to 2004 National Health and Nutrition Examination Surveys. We used SUDAAN for calculating age-adjusted prevalence estimates of demographic and health characteristics. The Satterthwaite adjusted F test and Student *t* test were used for subgroup comparisons.

Results. The women had different health profiles ($P<.05$) by generation and language preference. Second- and later-generation women and women who used more English were more likely to be sexually active, to have been younger at first intercourse, and to have had more male sexual partners than were first-generation women and women who used more Spanish. Compared with their first-generation counterparts, second- and later-generation women drank more alcohol, were better educated, had higher incomes, and were more likely to have health insurance. Third-generation women were more likely to have delivered a low-birthweight baby than were first-generation women.

Conclusions. Differences by generation and language preference suggest that acculturation should be considered when planning interventions to promote healthy reproductive behaviors among Mexican American women. (*Am J Public Health.* 2009;99:1300–1307. doi:10.2105/AJPH.2008.145169)

The Hispanic population in the United States increased from 35.7 million in 2000 to 44.3 million in 2006.[1–3] In 2005, there were an estimated 10.2 million Hispanic women aged 15 to 44 years, representing an increase of about 19% from 8.6 million in 2000.[2] The rapid increase in the Hispanic population has been attributed to immigration and high fertility.[4]

About two thirds of Hispanics in the United States are Mexican American,[3] and Mexican American women of reproductive age have higher birth rates than do women of other races and Hispanic origins.[4] This top ranking has not changed appreciably over time even though fertility and birth rates declined for Mexican and other Hispanic populations between 1990 and 2005.[5] Young Mexican American women aged 15 to 19 years also have higher fertility and birth rates than do young women of other races and Hispanic origins.[4] Preliminary US birth data for 2006 show that birth rates for Hispanic women aged 15–44 years are on the rise again and that more than 1 million Hispanic women gave birth in 2006, a record high.[6] Furthermore, Hispanic women of reproductive age are less likely to be using contraception (59%) than are non-Hispanic White women (65%).[7]

Recognizing the growing need for reproductive health services among the rapidly increasing Hispanic population, we studied demographics, measures of access to health care, sexual activity, pregnancy history, contraceptive use, and other health behaviors among Mexican American women aged 15–44 years from the 1999–2004 National Health and Nutrition Examination Surveys (NHANES), which collected nationally representative data through in-person interviews and physical and laboratory examinations. Many previous reports have focused more generally on Hispanic, Latina, or foreign-born women or on a single health behavior or outcome.[8–28]

To provide relevant and culturally appropriate information for program assessment, appropriate intervention planning, and resource allocation, we restricted our analysis to Mexican American women and stratified the sample by generational status and English or Spanish language preference. These factors are surrogate measures of acculturation, the process through which immigrant groups exchange cultural traits from their country of origin for those of their host country, and have been tied to reproductive health behaviors in previous research.[9,10,18–20,22–25,27,28] We hypothesized that their reproductive health would vary by level of acculturation.

METHODS

The National Health and Nutrition Examination Survey consists of a series of cross-sectional national health surveys conducted by the National Center for Health Statistics, Centers for Disease Control and Prevention. It is a complex, stratified, multistage probability sample designed to provide prevalence estimates describing the health and nutritional status of the civilian, noninstitutionalized US population.[29] Initially, NHANES collects demographic, socioeconomic, and health interview data in the home. Individuals are then asked to participate in physical examination and laboratory measurements in mobile examination centers. About 5000 individuals who reside in 15 counties are interviewed and examined each survey year; data are released every 2 years. The 1999–2004 surveys oversampled Blacks, Mexican Americans, adolescents aged 12 to 19 years, adults 60 years and older, low-income Whites, and pregnant women.

For our study, we included women who selected "Mexican" or "Mexican American"

as their ethnicity, hereafter referred to as "Mexican Americans." Data from 1999–2004 were combined to provide adequate sample sizes for statistically reliable subgroup estimates. The final study sample totaled 1673 Mexican American women aged 15–44 years. All questions asked in the home and mobile examination centers were available in Spanish.

Measures

Questions on sensitive topics (e.g., pregnancies and contraceptive use among all women, alcohol consumption and smoking among adolescents) were administered privately by an interviewer in the mobile examination centers. Sexual behavior questions were asked with an audio computer-assisted self-interview with touch-screen capability. The poverty income ratio was estimated as household income divided by the federal poverty level for a certain family size in the given calendar year.[30] Body mass index (BMI) was defined as weight in kilograms divided by height in meters squared. Data for some variables were not collected for all age groups; selected questions about sexual activity, for example, were given only to respondents who were 18 years and older. Exceptions to the age range of 15–44 years are provided in table footnotes.

We used respondent's birthplace, respondent's parents' birthplace, and Spanish and English language preference data from the personal interview to develop 2 commonly used measures of acculturation. First, we categorized women according to birthplace and the birthplaces of their parents to define generation. We developed 3 study groups: (1) women who were born in Mexico and whose parents (1 or both) were born in Mexico (first-generation women), (2) women who were born in the United States and whose parents (1 or both) were born in Mexico (second-generation women); and (3) women who were born in the United States and whose parents (both) were born in the United States (third-generation women). (Second- and third-generation women are also referred to as later-generation women). Twenty-eight women did not meet the criteria for inclusion in the generation-status study groups.

Second, we used the Short Acculturation Scale to establish study groups for language preference.[31] The Short Acculturation Scale is a summed score of 5 questions about usual use of Spanish: (1) "In general, what language do you read and speak?"; (2) "What was the language(s) you used as a child?"; (3) "What language(s) do you usually speak at home?"; (4) "In which language do you usually think?"; and (5) "What language(s) do you usually speak with your friends?" Each question was answered on a scale from 1 to 5, in which 1=only Spanish, 2=more Spanish than English, 3=both equally, 4=more English than Spanish, and 5=only English. Women were classified as "used more Spanish" if their scores ranged from 5 to 14 and "used more English" if their scores ranged from 16 to 25. Women with the median score of 15, who primarily used Spanish and English equally (n=90), or did not answer all the language questions (n=15) were excluded from the language analysis. Small sample sizes precluded separate analyses of the 90 women with a median score. "All Mexican American women" included those who met the study group definitions plus those who did not.

All prevalence estimates are presented according to both measures of acculturation: generation and language preference. Women described as "less acculturated" included first-generation women and those who tended to use Spanish more often than English; women described as "more acculturated" included later-generation women and those who tended to use English more often than Spanish.

Statistical Methods

We used SAS version 9.1 (SAS Institute Inc, Cary, NC) for Windows and SUDAAN version 9.0.1 (Research Triangle Institute, Research Triangle Park, NC), which incorporated Taylor series linearization methods and accounted for the design effect, appropriate sample weights, stratification, and clustering of the complex NHANES sample design.[32] Because differences in the age distributions between the study groups were statistically significant, we age-adjusted prevalence estimates to the year 2000 standard US population. We constructed 95% confidence intervals for all prevalence estimates and means. We used the Satterthwaite adjusted F test ($P<.05$) to simultaneously compare the percentage distributions of participant characteristics by generational status. If the null hypothesis of equality among the 3 generations was rejected, then we performed 2 pairwise Satterthwaite adjusted F tests ($P<.05$) to identify differences between the first-generation women (reference group) and later generations. We applied Bonferroni methods to adjust for multiple comparisons, and percentage distributions were treated as ordinal variables. We also used the Satterthwaite adjusted F test ($P<.05$) to compare the percentage distributions of participant characteristics by language preference with women using more Spanish than English as the reference group. We used the Student t test ($P<.05$) to compare means and prevalence estimates for binary responses (e.g., ever taken birth control pills).

RESULTS

Almost half of the women who reported that they were "Mexican American" were first-generation women (47.5%; Table 1). The preferences for Spanish (48.7%) versus English (45.0%) language use were similar. The demographic characteristics of Mexican American women differed by generation and by their day-to-day use of Spanish and English. The age, education, and income differences were large. About 9% of less-acculturated women were younger than 20 years compared with more-acculturated women (about 26%). About 65% of less-acculturated women had less than a high school education compared with more-acculturated women; the percentages for more-acculturated women were lower, ranging from 21.8% to 28.1%. About 42% of less-acculturated women lived below the federal poverty level compared with less than 28% of more-acculturated women.

Measures of access to health care also showed large differences across levels of acculturation (Table 1). First-generation Mexican American women (61.1%) and those who used more Spanish (63.1%) were more likely to not have any private or government health insurance than were third-generation women (27.2%) and those who used more English (25.5%). Moreover, these same women had no usual place to go (about 35%) or visited a clinic or health center (about 36%) when sick or in need of advice about health. By contrast, more than half of third-generation women and those who used more English than Spanish visited the doctor's office or a health

TABLE 1—Demographic and Health Care Access Characteristics of Mexican American Women Aged 15–44 Years (N = 1673), by Measures of Acculturation: National Health and Nutrition Examination Survey, 1999–2004

	All Mexican American Women,[a] % (95% CI)	Generational Status					Language Preference		
		First (Ref), % (95% CI)	Second, % (95% CI)	P[b]	Third, % (95% CI)	P[b]	Used More Spanish (Ref), % (95% CI)	Used More English, % (95% CI)	P[b]
Age, y				<.001		<.001			<.001
15–19	17.5 (16.9, 19.0)	9.2 (7.9, 10.6)	27.3 (22.6, 31.9)		26.9 (22.0, 31.9)		9.9 (8.6, 11.1)	25.3 (22.2, 28.5)	
20–29	38.9 (35.6, 42.2)	38.0 (34.1, 42.0)	46.1 (36.7, 55.5)		32.9 (25.1, 40.7)		38.9 (35.3, 42.5)	39.7 (33.6, 45.0)	
30–39	30.8 (27.4, 34.2)	38.6 (33.8, 43.3)	18.5 (9.0, 27.9)		24.9 (19.6, 30.1)		37.5 (33.2, 41.9)	23.2 (17.5, 29.0)	
40–44	12.8 (10.8, 14.8)	14.1 (11.3, 16.9)	8.1 (4.7, 11.6)		15.3 (10.4, 20.3)		13.8 (10.7, 16.8)	11.7 (8.5, 14.8)	
Education[c]				<.001		<.001			<.001
Less than high school	48.4 (43.1, 53.7)	64.1 (58.9, 69.4)	21.8 (16.9, 26.8)		28.1 (18.4, 37.9)		64.7 (58.4, 70.9)	22.7 (16.4, 28.9)	
High school	21.6 (17.8, 25.3)	17.5 (13.0, 22.0)	31.7 (24.5, 38.9)		27.8 (17.5, 38.1)		17.0 (13.0, 21.0)	29.8 (23.7, 35.9)	
More than high school	30.0 (25.2, 34.8)	18.3 (13.8, 22.9)	46.5 (37.7, 55.3)		44.1 (32.2, 55.9)		18.4 (13.0, 23.7)	47.5 (39.8, 59.3)	
Poverty income ratio[d]				<.001		<.001			<.001
<1	33.8 (29.7, 37.9)	42.1 (36.6, 47.6)	27.6 (16.4, 38.7)		23.7 (17.2, 30.2)		43.2 (37.5, 48.9)	23.9 (19.0, 28.8)	
1 to 2	33.2 (29.7, 36.6)	37.9 (33.4, 41.5)	28.4 (19.8, 37.1)		24.3 (18.3, 30.3)		37.1 (32.5, 41.7)	26.1 (21.6, 30.7)	
≥2	33.0 (29.3, 36.8)	20.4 (16.9, 24.0)	44.0 (36.2, 51.8)		52.0 (42.2, 61.9)		19.8 (15.5, 24.0)	50.0 (43.3, 56.7)	
Marital status[c]				.839		.391			.112
Never married	18.3 (15.6, 21.1)	14.6 (11.1, 18.1)	22.5 (15.7, 29.4)		23.4 (18.2, 28.6)		15.9 (12.4, 19.5)	20.0 (14.8, 25.1)	
Married or living with partner	70.0 (66.4, 73.7)	78.2 (74.6, 81.8)	60.9 (53.4, 68.4)		55.8 (46.6, 65.0)		76.2 (72.5, 78.9)	60.8 (53.5, 68.1)	
Widowed, divorced, or separated	11.6 (9.3, 14.0)	7.2 (5.3, 9.2)	16.6 (9.0, 24.2)		20.8 (12.2, 29.5)		7.8 (6.0, 9.7)	19.2 (13.4, 25.0)	
Health insurance				<.001		<.001			<.001
None	46.3 (41.5, 51.0)	61.1 (54.5, 67.7)	32.6 (20.3, 45.0)		27.2 (17.7, 36.6)		63.1 (56.7, 69.4)	25.5 (19.7, 31.3)	
Private[e]	42.2 (37.5, 47.0)	28.9 (23.4, 34.4)	57.1 (45.1, 69.0)		59.2 (48.4, 69.9)		26.1 (20.7, 31.6)	63.0 (56.7, 69.4)	
Government	11.5 (9.1, 13.8)	10.0 (6.8, 13.3)	10.3 (5.7, 14.9)		13.7 (9.5, 17.9)		10.8 (7.5, 14.1)	11.5 (8.0, 14.9)	
Kind of place usually go when sick or need advice about health				.922		<.001			<.01
No usual place	25.9 (22.7, 29.2)	34.9 (30.7, 39.2)	24.1 (12.2, 36.0)		10.8 (6.6, 15.0)		35.7 (31.2, 40.2)	14.3 (9.2, 19.4)	
Clinic or health center	30.1 (25.9, 34.3)	36.9 (31.9, 42.0)	13.4 (9.0, 17.7)		27.4 (18.9, 35.8)		36.0 (30.9, 41.1)	20.3 (14.6, 26.1)	
Doctor's office or HMO	39.8 (35.7, 44.0)	24.1 (18.5, 29.6)	58.8 (48.2, 69.5)		57.8 (49.3, 66.2)		24.2 (18.6, 29.8)	61.4 (56.0, 66.8)	
Other, hospital, emergency, or outpatient	4.1 (2.6, 5.6)	4.1 (1.8, 6.4)	3.7 (0.9, 6.5)		4.1 (1.1, 7.0)		4.1 (2.0, 6.2)	3.9 (2.1, 5.8)	

Note. CI = confidence interval; HMO = health maintenance organization. Except for age, percentages were age-adjusted to the 2000 standard US population by using age groups 15–19, 20–29, 30–39, and 40–44 years; missing data and refused or "don't know" responses were not included in the analyses. Sample sizes for generation categories were: first generation, n = 795; second generation, n = 464; and third generation, n = 386. Sample sizes for language preference categories were: respondent used more Spanish, n = 815; respondent used more English, n = 753.

[a]Some Mexican American women did not meet the study group definitions and were included only in the All Mexican American Women column; therefore, counts in the Generational Status and Language Preference columns do not equal the number in the All Mexican American Women column.

[b]Statistical test compared the given group to the referent group. The Satterthwaite adjusted F statistic was used for pairwise comparison of multilevel variables; the *t* test was used for other comparisons.

[c]Includes only women aged 20–44 years (n = 910); percentages were age-adjusted to the 2000 standard US population by using age groups 20–29, 30–39, and 40–44 years.

[d]Poverty income ratio: <1 = less than federal poverty level; 1 to 2 = at or above the federal poverty level; ≥2 = twice the federal poverty level.

[e]Includes 1 respondent covered by a Single Service Plan.

maintenance organization as their usual place of care.

About one third of less-acculturated women reported that their health in general was "excellent" or "very good" compared with nearly half of the more-acculturated women (Table 2); the use of the Bonferroni correction, however, suggested that the generation differences were no longer significant. Some healthy behaviors and medical characteristics were inversely related to acculturation; that is, later-generation women and those with greater English language use tended to exhibit less healthy behaviors than did first-generation women and women who used Spanish more often. More-acculturated

TABLE 2—Health Behaviors and Conditions Among Mexican American Women Aged 15–44 Years (N = 1673), by Measures of Acculturation: National Health and Nutrition Examination Survey, 1999–2004

	All Mexican American Women[a]	Generational Status					Language Preference		
		First (Ref)	Second	P[b]	Third	P[b]	Used More Spanish (Ref)	Used More English	P[b]
Health in general, % (95% CI)				<.05		<.05			<.001
Excellent	16.6 (14.1, 19.2)	16.0 (12.8, 19.2)	17.3 (10.3, 24.2)		18.2 (11.6, 24.9)		16.2 (12.8, 19.5)	18.1 (14.1, 22.1)	
Very good	22.0 (19.4, 24.6)	15.4 (11.9, 19.0)	29.3 (22.1, 36.5)		30.1 (24.1, 36.2)		14.4 (11.1, 17.7)	32.3 (28.2, 36.3)	
Good	37.9 (34.9, 40.9)	41.9 (37.7, 46.2)	35.2 (27.3, 43.2)		29.5 (23.8, 35.2)		42.2 (37.8, 46.5)	31.5 (27.5, 35.6)	
Fair or poor	23.5 (21.0, 26.0)	26.6 (22.5, 30.7)	18.3 (10.2, 26.3)		22.1 (15.7, 28.6)		27.3 (23.0, 31.6)	18.1 (13.0, 23.2)	
Blood pressure, mmHg, mean (95% CI)									
Systolic	110.9 (110.0, 111.8)	110.1 (109.1, 111.0)	113.3 (110.1, 116.4)	.055	111.4 (109.7, 113.2)	.151	110.5 (109.5, 111.5)	111.3 (109.6, 112.9)	.411
Diastolic	67.0 (66.1, 67.9)	65.6 (64.8, 66.3)	69.2 (67.1, 71.2)	<.001	68.8 (67.6, 70.0)	<.001	65.8 (64.9, 66.8)	68.7 (67.3, 70.1)	<.001
LDL, mg/dL, mean (95% CI)[c]	108.3 (104.7, 111.8)	111.7 (107.4, 116.0)	101.8 (92.5, 111.1)	<.05	103.5 (96.8, 110.2)	<.05	110.4 (105.7, 115.0)	105.7 (100.9, 110.5)	.130
Currently smoking, % (95% CI)	14.8 (12.7, 16.9)	11.3 (8.8, 13.7)	9.7 (5.4, 14.0)	.547	27.5 (19.7, 35.2)	<.001	11.1 (8.6, 13.6)	21.2 (15.8, 26.7)	<.01
Number of days drank alcoholic beverages during past 12 mo, % (95% CI)[d,e]				<.01		<.001			<.001
0	52.8 (47.5, 58.1)	63.1 (56.6, 69.5)	42.1 (31.9, 52.4)		29.9 (21.6, 38.2)		61.7 (54.5, 68.9)	37.1 (30.1, 44.1)	
1–11	17.8 (14.6, 20.9)	19.6 (15.3, 23.9)	16.2 (6.6, 25.8)		14.7 (8.2, 21.2)		20.7 (16.4, 24.9)	13.2 (9.0, 17.3)	
12–51	17.8 (15.1, 20.5)	12.8 (9.8, 15.9)	24.6 (12.5, 36.6)		29.9 (23.1, 36.6)		12.5 (9.8, 15.2)	26.3 (20.5, 32.1)	
≥52	11.6 (8.6, 14.7)	4.5 (1.5, 7.6)[f]	17.1 (6.5, 27.7)		25.5 (15.5, 35.5)		5.2 (1.8, 8.6)[f]	23.5 (16.5, 30.4)	
Body mass index, % (95% CI)[d,g]				.789		.073			.233
<25.0 kg/m^2	31.6 (27.4, 35.7)	32.6 (25.9, 39.3)	30.9 (16.8, 45.0)		30.6 (20.1, 41.0)		32.5 (25.6, 39.4)	33.0 (25.7, 40.3)	
25.0–29.9 kg/m^2	33.2 (29.4, 36.9)	36.9 (30.7, 43.0)	37.4 (20.2, 54.6)		19.7 (11.4, 28.1)		36.9 (31.5, 42.4)	24.6 (17.9, 31.2)	
>29.9 kg/m^2	35.3 (30.4, 40.2)	30.6 (24.4, 36.8)	31.7 (17.9, 45.5)		49.7 (38.5, 60.9)		30.6 (24.5, 36.6)	42.5 (34.2, 50.7)	
Leisure physical activity, % (95% CI)[h,i]									
No activity	47.1 (42.7, 51.5)	58.4 (53.3, 63.4)	32.2 (23.1, 41.4)	<.001	29.4 (22.8, 36.0)	<.001	59.0 (53.9, 64.1)	27.7 (23.0, 32.4)	<.001
Moderate	39.6 (35.7, 43.4)	30.5 (25.8, 35.2)	49.1 (38.9, 59.2)	<.01	55.1 (47.3, 62.9)	<.001	30.2 (25.4, 34.9)	55.5 (50.3, 60.7)	<.001
Vigorous	28.0 (25.0, 31.0)	19.1 (15.2, 22.9)	37.8 (30.0, 45.7)	<.001	43.0 (36.5, 49.5)	<.001	19.0 (15.2, 22.8)	42.7 (37.0, 48.5)	<.001

Note. CI = confidence interval; LDL = low-density lipoprotein. Respondents were both interviewed and examined; percentages were age-adjusted to the year 2000 standard US population by using age groups 15–19, 20–29, 30–39, and 40–44 years; missing data and refused or "don't know" responses were not included in the analyses. Sample sizes for generation categories were: first generation, n = 795; second generation, n = 464; and third generation, n = 386. Sample sizes for language preference categories were: respondent used more Spanish, n = 815; respondent used more English, n = 753.

[a]Some Mexican American women did not meet the study group definitions and were included only in the All Mexican American Women column; therefore, counts in the Generational Status and Language Preference columns do not equal the number in the All Mexican American Women column.

[b]Statistical test compared the given group to the referent group. The Satterthwaite adjusted F statistic was used for pairwise comparison of multilevel variables; the *t* test was used for other comparisons.

[c]One half sample; fasting weights were used.

[d]Includes only women aged 20–44 years (n = 877); percentages were age-adjusted to the year 2000 standard US population by using age groups 20–29, 30–39, and 40–44 years.

[e]Includes zero days.

[f]Estimate was considered unreliable because of a relative standard error > 30.

[g]Excludes pregnant females; body mass index categories: < 25.0 kg/m^2 = underweight or normal weight; 25.0 kg/m^2–29.9 kg/m^2 = overweight; ≥ 30.0 kg/m^2 = obese.

[h]Includes only women aged 16–44 years (n = 1463); percentages were age-adjusted to the year 2000 standard US population by using age groups 16–19, 20–29, 30–39, and 40–44 years.

[i]Leisure physical activity: moderate = done for at least 10 minutes causing only light sweating or a slight to moderate increase in breathing or heart rate; vigorous = done for at least 10 minutes causing heavy sweating or large increases in breathing or heart rate; participants could report both moderate and vigorous activity.

women had slightly higher mean diastolic blood pressure than did less-acculturated women, but there were no differences by acculturation for mean systolic blood pressure. Average low-density lipoprotein level was in the near-optimal range for all Mexican American women. Third-generation Mexican American women and those who used more English than Spanish were about twice as likely to be currently smoking, and they drank alcohol on more days during the past 12 months than did first-generation women and those who used more Spanish than English.

About two thirds of women were overweight or obese (BMI ≥ 25.0 kg/m^2), although BMI results were not statistically significant for generation or language preference. In a beneficial direction, more-acculturated women were more likely to participate in moderate or vigorous physical activity than were less-acculturated women.

Sexual behaviors were related to acculturation. Later-generation Mexican American women were more likely to be sexually active than were first-generation women; this relationship was also evident with language preference (Table 3). Use of the Bonferroni correction suggested that the age at first menstrual period findings were not significantly different by language preference. Approximately 90% of more-acculturated women indicated that they had ever had sexual intercourse, compared with approximately 80% of less-acculturated women. On average, more-acculturated women were younger (aged 16 or 17 years) when they first had sexual intercourse and had more lifetime male partners (more than 4) than did less-acculturated women (approximately aged 18.5 years and a mean of 2.7 lifetime male partners). Thirty-eight women (3%) tested positive for chlamydia, 1 tested positive for HIV, and 35 were diagnosed with genital warts, genital herpes, or both, but these sample sizes were too small for analyses by levels of acculturation.

Similar to sexual activity, characteristics related to pregnancy were related to acculturation. More-acculturated Mexican American women were more likely to have never been pregnant than were less-acculturated women, although parity did not differ significantly when the Bonferroni correction was applied. The percentage of Mexican American women who were currently pregnant did not vary by generation or language preference. Regardless of generation or language preference, Mexican American women had their first baby, on average, at around age 20 years. First-generation women (76.3%) and women who used more Spanish than English (75.5%) were more likely, however, to have breastfed their children for at least 1 month than were later-generation women (about 56%) and those who used more English than Spanish (56.2%). Third-generation women (13.6%) were nearly twice as likely as first-generation women to have had a low-birthweight baby (7.3%).

Finally, contraceptive use varied by generation and language preference. Approximately 69.7% of third-generation Mexican American women had taken birth control pills at some time in their reproductive lives, compared with 48.1% of first-generation women; the comparable percentages by language use were 66.9% for women who used more English and 47.9% for those who used more Spanish. In addition, more-acculturated women were younger (approximately aged 19 years) when they first used birth control pills than were less-acculturated women (aged 21 years). More-acculturated women appeared to be less likely to have ever used Depo-Provera (Pfizer, New York, for US-made products, Upjohn, Brussels, Belgium for all others) than did less-acculturated women, but the difference was statistically significant only among second-generation women.

DISCUSSION

Mexican American women of reproductive age in the United States had diverse health profiles depending on their level of acculturation as measured by generation and day-to-day use of Spanish and English. More-acculturated women were more likely to be sexually active and, on average, to have had sexual intercourse for the first time at a younger age and to have had more male partners than did less-acculturated Mexican American women. Third-generation Mexican American women were more likely to have delivered a low-birthweight baby than were first-generation Mexican American women. More-acculturated women were also more likely to have a better education, higher household income, and private health insurance, and they were more likely to report moderate or vigorous exercise. Mexican American women who used more Spanish than English, however, drank alcohol less, were less likely to be currently smoking, and were more likely to breastfeed for at least 1 month than were those more acculturated to life in the United States.

The findings from our study are generally consistent with the existing literature that describes differences in health status among Hispanic populations.[8–13] These studies were based on multiple national data systems and usually focused on Hispanic women instead of on ethnic-specific Hispanic populations. The 1998 to 2003 National Health Interview Surveys showed significant differences in physical health between US- and foreign-born Hispanics.[8] Similar to the Mexican-born women in our study, foreign-born Hispanics from those studies were less educated, less likely to have a usual place to go for health care, and more likely to have no health insurance; on the positive side, they smoked less.[8,9] Analyses of linked birth and death certificate data also showed fewer medical risks in Mexican-born than in US-born Hispanic women.[10] Data from the Pregnancy Risk Assessment Monitoring System showed that Hispanic mothers were younger, of lower socioeconomic status, and less likely to receive prenatal care than were non-Hispanic White mothers; however, they were less likely to smoke and drink during pregnancy and more likely to breastfeed.[12] In our study, 11% of Mexican American women were currently using oral contraceptives, similar to the percentage reported for Latina women in the National Survey of Family Growth (13%).[13]

Mexican American adults and youths in the United States have been shown to have high prevalence of overweight and obesity.[14,15] Previous analyses of NHANES showed that obesity increased between NHANES III (1988–1994) and NHANES 1999–2002 for Mexican American men and women and for adolescents.[14] In a study of Mexican adolescents in Matamoros, Mexico, and the Lower Rio Grande Valley area of Texas, nearly one third of the students on both sides of the United States–Mexico border were overweight.[15] A cross-sectional study of adults of Mexican descent in Harris County, Texas, showed that Mexican-born men and women were less likely to be obese than were US-born men and women.[16] Another analysis of 2000 to 2001 NHANES data showed that Mexican Americans who were less acculturated were less likely to be obese (BMI ≥ 30.0 kg/m^2). However, those who were less acculturated but who were overweight (BMI ≥ 25.0 kg/m^2) were less likely to perceive themselves as overweight and to try to lose weight.[17] Our study did not demonstrate statistically significant differences by BMI across study groups.

Previous studies have suggested that the prevalence of low-birthweight babies delivered by Mexican American women was low compared with non-Hispanic populations and, in general, did not differ by measures of acculturation.[9,10,18–21]

TABLE 3—Reproductive History for Mexican American Women Aged 15–44 Years, by Measures of Acculturation: National Health and Nutrition Examination Survey, 1999–2004

	All Mexican American Women[a]	Generational Status					Language Preference		
		First (Ref)	Second	P[b]	Third	P[b]	Used More Spanish (Ref)	Used More English	P[b]
Age at first menstrual period, % (95% CI)[c]				NA		NA			<.05
<12 y	25.8 (22.8, 28.7)	21.6 (17.7, 25.5)	33.2 (25.5, 41.0)		29.9 (22.9, 37.0)		22.9 (18.6, 27.1)	30.9 (26.1, 35.6)	
12–14 y	64.4 (60.9, 67.9)	67.7 (63.2, 72.3)	55.5 (48.9, 62.2)		62.6 (55.7, 69.5)		66.9 (61.7, 72.0)	59.8 (54.6, 65.0)	
≥15 y	9.8 (7.6, 12.0)	10.6 (7.9, 13.4)	11.2 (3.3, 19.2)[d]		7.4 (2.2, 12.6)[d]		10.3 (7.7, 12.8)	9.4 (5.2, 13.5)	
Ever had sexual intercourse, % (95% CI)	85.6 (83.3, 87.9)	80.4 (77.4, 83.5)	89.2 (85.3, 93.0)	<.001	93.2 (90.9, 95.6)	<.001	80.8 (77.6, 84.1)	91.8 (90.0, 93.7)	<.001
Age at first intercourse, mean y (95% CI)	17.8 (17.5, 18.1)	18.6 (18.3, 18.9)	17.4 (16.5, 18.3)	<.05	16.4 (15.9, 16.9)	<.001	18.5 (18.2, 18.8)	16.8 (16.3, 17.2)	<.001
Number of lifetime male partners, mean (95% CI)[e,f]	4.5 (3.8, 5.1)	2.7 (2.1, 3.3)	4.4 (3.4, 5.5)	<.01	8.2 (5.9, 10.6)	<.001	2.7 (2.1, 3.3)	7.1 (5.5, 8.6)	<.001
Number of male partners in past 12 mo, mean (95% CI)[e,f]	1.3 (1.2, 1.4)	1.1 (1.1, 1.2)	1.4 (1.1, 1.6)	.059	1.5 (1.3, 1.7)	<.01	1.0 (1.1, 1.2)	1.4 (1.3, 1.6)	<.001
Number of pregnancies, % (95% CI)[c]				<.05		.138			<.05
0	24.5 (22.3, 26.7)	19.7 (16.9, 22.5)	34.3 (27.5, 41.0)		24.8 (19.9, 29.7)		21.4 (18.5, 24.3)	27.4 (23.8, 31.0)	
1	14.0 (12.3, 15.7)	16.3 (13.4, 19.3)	7.0 (4.3, 9.7)		17.1 (10.1, 24.0)		14.1 (11.4, 16.9)	15.3 (11.2, 19.5)	
2	18.2 (15.2, 21.1)	18.9 (16.0, 21.9)	21.6 (15.4, 27.7)		16.1 (10.9, 21.3)		19.8 (16.3, 23.3)	15.4 (10.3, 20.5)	
≥3	43.3 (40.5, 46.2)	45.1 (41.3, 48.8)	37.2 (29.0, 45.3)		42.1 (33.3, 50.9)		44.7 (41.0, 48.3)	41.8 (35.6, 48.1)	
Currently pregnant, % (95% CI)[c]	9.5 (7.9, 11.1)	10.5 (8.2, 12.9)	9.6 (4.2, 15.1)	.766	10.4 (5.5, 15.4)	.974	10.6 (8.2, 13.0)	8.7 (5.6, 11.8)	.388
Age at first live birth, mean y (95% CI)[c]	20.2 (20.0, 20.5)	20.5 (20.2, 20.7)	20.1 (19.2, 21.0)	.343	19.7 (18.8, 20.5)	.057	20.3 (20.0, 20.6)	20.1 (19.5, 20.8)	.537
Breastfed child for at least 1 mo, % (95% CI)[g]	68.0 (64.1, 72.0)	76.3 (72.0, 80.6)	57.7 (50.1, 65.3)	<.001	54.6 (42.2, 66.9)	<.001	75.5 (71.0, 79.9)	56.2 (50.1, 62.2)	<.001
Low-birthweight baby, % (95% CI)[g]	9.1 (6.6, 11.7)	7.3 (4.3, 10.4)	9.5 (4.8, 14.3)	.416	13.6 (7.9, 19.2)	<.05	8.3 (5.0, 11.6)	10.9 (6.6, 15.1)	.322
Birth control pills[h]									
Ever taken, % (95% CI)	55.9 (51.9, 59.9)	48.1 (42.8, 53.4)	58.1 (48.1, 68.2)	.076	69.7 (62.5, 76.8)	<.001	47.9 (42.5, 53.3)	66.9 (62.3, 71.5)	<.001
Currently using, % (95% CI)	11.0 (8.4, 13.5)	8.6 (6.0, 11.2)	16.4 (10.8, 22.0)	<.01	10.6 (5.2, 16.1)	.459	9.5 (6.6, 12.3)	13.1 (9.2, 17.0)	<.05
Age began use, mean y (95% CI)	20.2 (19.8, 20.6)	21.4 (20.9, 21.8)	19.1 (18.1, 20.0)	<.001	18.6 (17.9, 19.3)	<.001	21.3 (20.8, 21.7)	18.8 (18.3, 19.3)	<.001
Number of mo used, mean (95% CI)	37.5 (33.0, 41.9)	30.5 (25.9, 35.0)	54.2 (40.7, 67.7)	<.001	44.8 (32.9, 56.6)	<.05	32.1 (27.2, 37.0)	46.4 (38.2, 54.6)	<.01
Depo-Provera[c]									
Ever used, % (95% CI)	19.1 (16.2, 21.9)	21.0 (16.8, 25.1)	12.3 (7.0, 17.6)	<.05	17.6 (11.7, 23.6)	.377	20.3 (16.2, 24.4)	15.6 (11.2, 19.9)	.090
Currently using, % (95% CI)	4.5 (2.6, 6.4)	5.2 (2.7, 7.6)	2.9 (0.7, 5.2)[h]	.173	1.7 (0.7, 7.8)[h]	.617	4.6 (2.1, 7.1)	4.6 (1.8, 7.4)	.979

Note. CI = confidence interval; NA = pairwise comparison not applicable. Respondents were both interviewed and examined; percentages were age-adjusted to the year 2000 standard US population by using age groups 15–19, 20–29, 30–39, and 40–44 years; missing data and refused or "don't know" responses were not included in the analyses. The statistical significance for the overall test of association between age at first menstrual period and generational status was $P = .114$. Sample sizes for generation categories were: first generation, n = 795; second generation, n = 464; and third generation, n = 386. Sample sizes for language preference categories were: respondent used more Spanish, n = 815; respondent used more English, n = 753.

[a]Some Mexican American women did not meet the study group definitions and were included only in the All Mexican American Women column; therefore, counts in the Generational Status and Language Preference columns do not add to the number in the All Mexican American Women column.

[b]Statistical test compared the given group to the referent group. The Satterthwaite adjusted F statistic was used for pairwise comparison of multilevel variables; the *t* test was used for other comparisons.

[c]Includes only postmenarche females.

[d]Estimate was considered unreliable because of a relative standard error > 30.

[e]Includes only women aged 18–44 years (n = 1184); percentages were age-adjusted to the year 2000 standard US population by using age groups 18–19, 20–29, 30–39, and 40–44 years.

[f]Includes only those who reported partners.

[g]Includes only postmenarche females and those who had at least 1 live birth.

[h]Includes only postmenarche females and those who reported taking birth control pills.

Our study shows that third-generation Mexican American women were more likely to deliver a low-birthweight infant than first-generation women. According to vital statistics from all 50 states in 2000, Mexican American women were less likely to give birth to a low-birthweight infant than most other populations; moreover, the percentage of Mexican American women with low-birthweight infants was lower for those born outside the United States (5.5%) than inside (6.8%).[9] Kelaher et al. found that low-birthweight prevalence was higher among US-born Latinas than documented foreign-born Latinas, but did not find differences between undocumented and documented foreign-born women nor between undocumented foreign-born and US-born women.[18] Another study documented a lower prevalence of low-birthweight infants delivered by foreign-born Mexican mothers, even those with very low incomes, than among US-born Mexican mothers.[19]

Several studies have demonstrated a relationship between breastfeeding and acculturation.[22–24] Similar to another study based on NHANES data,[22] our study showed less breastfeeding among later-generation Mexican American women and among those who used more English than among first-generation women and those who used more Spanish. The estimates from our study were higher than those from Gibson et al.'s study,[22] and we used a different cutpoint to measure language use. A study of Hispanic women in a hospital postpartum unit on the United States–Mexico border found that intention to breastfeed was more common among those born in Mexico and who finished school in Mexico.[23] A study in Brownsville, Texas, that considered language use, heritage, and the backgrounds of friends and other social contacts, found that the initiation of breastfeeding was highest among the least-acculturated women and lowest among those most-acculturated women.[24]

Our study had numerous strengths. First, the data were representative of the noninstitutionalized US population. Second, the survey protocol required direct measurement of numerous characteristics during the physical examination, including blood pressure, cholesterol, height, and weight; that is, the measurement of these variables was based on laboratory data and not self-report. Third, the study provided 2 measures of acculturation—generational status and language preference. Although this study was not designed to compare the validity and reliability of these 2 measures, data based on both measures were provided for use by researchers and program intervention managers. Of note, there is a large overlap between the first-generation respondents and those who used more Spanish than English (N=696). Fourth, Spanish versions of the questionnaires were available for use with the Mexican study population. Finally, the most sensitive self-report data were collected in the mobile examination centers during a private, in-person interview or a computer-assisted self-interview that employed touch-screen technology.

Recall bias, selection bias, and small sample sizes should be considered as limitations. Small sample sizes for several measures precluded analyses stratified by generational status and language preference. Although NHANES samples the resident population of the United States without regard to immigration status, it is possible that undocumented Mexican American women, who routinely need and access reproductive health services, had a lower response rate than did legal immigrants or citizens and are therefore underrepresented in this study population. Also, self-reported data are subject to recall bias, misinterpretation, and error.

Similar to other studies, we found different reproductive health profiles for Mexican American women depending on their level of acculturation.[9,10,18–20,22–25,27,28] Traditional values, cultural beliefs, and attitudes have been linked to fertility behaviors and maternal outcomes among foreign-born women in general, and immigrant Mexican American women in particular. A qualitative study suggested that several factors, including sexual silence (not talking about sexual activity, sexuality, and contraception) and taking control of self (use of effective woman-controlled contraception), may influence sexual health in Mexican American women.[33] The extent to which traditional values and cultural attitudes and beliefs influenced the findings in our study could not be examined directly but can only be inferred from differences observed across the 2 measures of acculturation. Perhaps some values and beliefs are more easily influenced by the majority culture whereas others are more likely to be passed along to the next generation.

Mexican American women are the largest population of Hispanic women in the United States, and they have very diverse reproductive health profiles, depending on their generation and day-to-day use of Spanish and English. Their health services needs are likewise diverse. Our study provides generation and language-preference groupings as surrogate measures of acculturation that can be used to develop appropriate health messages and intervention strategies for increasing access to care and promoting healthy behaviors in this rapidly growing population. For example, because breastfeeding is less common among later-generation women, targeted campaigns may be helpful in encouraging these mothers to nurse. Also, smoking is more common among third-generation women and those who speak more English; thus, efforts to prevent smoking initiation and to reduce smoking during pregnancy might be most effective when targeted to these groups. Medical providers and developers of health education materials may want to consider the heterogeneity of both healthy and risky behaviors exhibited within generation or language groups when planning public health interventions. Future research efforts should be directed toward assessing the success of new health messages and intervention strategies. ■

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Note. *The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention. Use of trade names is for identification only and does not imply endorsement by the US Department of Health and Human Services.*

Contributors

P.A. Wingo originated the study, supervised all aspects of its implementation, and drafted the article. A. Kulkarni developed the analysis file, created analytic variables, and performed statistical tests. L.G. Borrud performed statistical tests, synthesized analyses, and drafted the

statistical methods. J. A. McDonald helped to conceptualize the article, contributed to the plans for the statistical analyses, provided extensive knowledge of the existing literature, and made extensive revisions to the content. S. A. Villalobos participated in planning the study and analyses and assisted with reviews of the article. D. C. Green assisted in the interpretation of the data, the organization of the content of the article, and significant revisions in content.

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Human Participant Protection

The survey protocol was approved by the institutional review board of the National Center for Health Statistics, Centers for Disease Control and Prevention, Hyattsville, MD. Informed consent was obtained from all participants.

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