A meal nourishes the body for a day; mealtime nourishes the soul for life.

In this Rio Grande City kitchen, this family cooks up more than dinner. The kitchen is adjacent to a family meat market where beef, un caja de tripas, *and whole chickens are sold alongside favorites like* chorizo *and* fajita sazonada. *On Saturdays and Sundays,* barbacoa *and* menudo calientito *expand the menu. Food brings money into this household, but for many in the Lower Rio Grande Valley, food costs are a burden. Low incomes, according to research, translate to significantly reduced intake of calcium, vitamin A, vitamin C, niacin, and potassium. Surveys in one nutrition program showed that at entry participants ate as little as 10.6% and no more than 69.5% of the recommended daily servings of major food groups. Local agencies, including those in Rio Grande City delivering nutrition education for mothers, food for the elderly, and snacks after school, try to ensure each generation gets the nutrition it needs. That way, young and old can continue to gather in the kitchen and, in the making and sharing of food, enjoy more than just a meal.*

5

Food and Nutrient Intake and How It Is Affected by Health Knowledge, Attitudes, and Practices

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OVERVIEW

ECONOMIC STATUS, CULTURE, ETHNICITY, TRADITION, regional characteristics, food availability, age, and lifestyle affect food choice in the Lower Rio Grande Valley. Expanded Food and Nutrition Education Program data collected 2001–2002 in Cameron and Hidalgo counties indicate that though significant improvements in dietary habits were reported after completion of the program, at the outset participants were more likely not to meet food group intake requirements than to meet them.

Income level highly influences food choice, and suboptimal intake of specific nutrients is a cause of concern. Low income in Mexican Americans has been associated with significantly lower intake of calcium, vitamin A, vitamin C, niacin, and potassium and higher intake of cholesterol.

The U.S. Department of Agriculture's 1994–1996 national Continuing Survey of Food Intakes by Individuals indicated that in comparison with non-Hispanic whites Mexican Americans ate fewer vegetables, more fruit, more eggs, and more legumes; drank fewer alcoholic and carbonated soft drinks; and consumed similar levels of milk and protein. How similar food intake in the Lower Rio Grande Valley is to that in this national sample is unknown. A study in Starr County found that diets of residents had dietary fat and saturated fat intake levels above those recommended by the federal government. A separate investigation determined that 92% of mothers postpartum did not consume the recommended daily amount of folate, and studies of children in Pharr indicated that suboptimal intake of calcium, folate, iron, and zinc threaten growth and well-being. Adolescents in the Lower Rio Grande Valley are more likely to be at risk of being overweight and actually being overweight than are Texas adolescents.

Research aimed at better characterizing food and nutrient intake is necessary to identify appropriate interventions. > > >

Food choices among the residents of the Lower Rio Grande Valley are largely determined by factors that affect the food choices of people everywhere else. These factors include economic status, culture, ethnicity, tradition, regional characteristics, food availability, age, and lifestyle. A large percentage of the residents of the Lower Rio Grande Valley are of Mexican heritage; therefore, foods such as homemade tortillas, tacos, enchiladas, fajitas, tamales, *arroz y frijoles* (rice and beans), and *cabrito* (goat meat) are extremely popular mainstays among local residents. Tamales are delicious packets of *masa* (corn dough) usually filled with meat, chicken, or pork and wrapped in dried cornhusks until eaten.

In addition to these popular ethnic foods, residents in the Lower Rio Grande Valley enjoy typical Western foods such as pizza, hamburgers, hot dogs, and French fries, as is evidenced by fast food chains and popular restaurant chains on nearly every busy street corner. As the residents of the Lower Rio Grande Valley become more Westernized with each generation, a migration to fast and convenient foods has become more apparent by the greater availability of these foods. Other reasons for the move toward fast foods include the increased number of women joining the workforce and the increasing number of single-parent homes, which leaves less time to cook at home. Fewer meals are prepared at home than ever before, but this is true of many American families, not just residents of the Lower Rio Grande Valley.

The traditional Lower Rio Grande Valley diet has the nutritional strengths and weaknesses of the traditional Mexican diet. Based on maize, beans, *calabacitas* (squash), and other vegetables, such as chilies and tomatoes, which are high in vitamins A and C, the diet has the advantages of being semivegetarian and high in complex carbohydrates. Another advantage of the diet is that the bioavailability of calcium and niacin is enhanced by the traditional methods of preparing corn tortillas by heating maize with lime. On the negative side, traditional Mexican food preparation methods add liberal amounts of fat, and there is a preference for high-fat meats, including *chorizo* (sausage) and organ meats, and cheese.

Income level is a major determinant of food choices. The high percentage of low-income households in the Lower Rio Grande Valley means that many families have limited access to food. Although assistance in the form of food stamps and school lunch and breakfast programs are available, insufficient intake of specific nutrients is a cause of concern for this population group.

More research data are needed to portray an accurate picture of the food and nutrient intake of Lower Rio Grande Valley residents. This chapter is a compilation of the published information that is currently available.

FOOD INTAKE

In general, there is little published information about food and nutrient intake of Mexican Americans living in the Lower Rio Grande Valley area; thus, until more local studies can be completed only inferences can be made about the food and nutrient intake of this region. One source of local information on dietary intake is the Expanded Food and Nutrition Education Program (EFNEP). Using a 24-hour recall, EFNEP routinely gathers data from homemakers enrolled in its program. Of 254 counties in the state of Texas, only nine counties offer EFNEP, which is mostly based on availability of funds and number of people living at or below poverty level. Hidalgo and Cameron counties ranked fourth and seventh respectively, in terms of the number of people in poverty in the state of Texas (Texas Institute for Health Policy Research, 2000). EFNEP is not offered in Willacy and Starr counties, even though they rank high in the percentage of the population in poverty. The basis for qualification for EFNEP lies in the total number of people in poverty and not the percentage in poverty.

Data on food intake at program entry for October 1, 2001, through September 30, 2002, are provided by county in Table 5.1 for 330 EFNEP graduates from Cameron and 335 graduates from Hidalgo counties. Comparison of mean food group servings shown in Table 5.1 to the U.S. Department of Agriculture Food Guide Pyramid recommendations indicates that on average only the Cameron County intakes of the calcium and dairy group met recommendations. Results from the Continuing Survey of Food Intakes of Individuals 1994–96 reporting the typical American diet contained 6.67 grain servings, 1.5 fruit servings, 3.33 vegetable servings, 1.5 dairy servings, and 4.75 ounces (approximately 2 servings) of meat (Tippett, Wilkinson Enns, & Moshfegh, 1999). Further examina-

Table 5.1. Daily Servings of Selected Food Groups by Expanded Food and Nutrition Education Program Graduates—Cameron and Hidalgo Counties, October 2001 to September 2002

Food Group	Cameron County (N = 335) (Mean ± SD)	Hidalgo County (N = 330) (Mean ± SD)
Bread and cereals	5.5 ± 2.5	4.7 ± 2.7
Fruits	1.4 ± 1.5	0.7 ± 1.0
Vegetables	1.7 ± 1.2	1.0 ± 1.1
Calcium/dairy	2.2 ± 1.2	1.8 ± 1.3
Meats and alternatives	1.3 ± 1.1	0.6 ± 0.8

Note: SD, standard deviation.

Table 5.2. Percentage of Expanded Food and Nutrition Education Program Participants Consuming Recommended Servings of Major Food Groups at Entry—Cameron and Hidalgo Counties, October 2001 to September 2002

Food Group	Recommended Servings	Cameron County	Hidalgo County
Breads and cereals	6–11	51.1%	32.1%
Fruits	2+	41.2%	16.4%
Vegetables	3+	22.1%	10.6%
Calcium/dairy	2+	69.5%	51.8%
Meats and alternatives	2+	38.8%	14.8%

tion of the EFNEP graduate data reveals that in Cameron and Hidalgo County only 10.6% to 69.5% of the participants consumed recommended servings of the major food groups daily at entry into their training program (Table 5.2). The EFNEP reported significant improvements in dietary habits of their graduates at exit from their educational program.

EFNEP also surveyed participants on aspects of their dietary behavior. In one survey conducted in Hidalgo County, 56% of 330 homemakers contemplated purchasing healthy food items most of the time or almost always when deciding what types of food to feed their families. Forty-nine percent of the participants did not use the nutrition facts on food labels to make smarter and better food choices. An alarming 58% of the homemakers surveyed did not have their children eat breakfast on most days. Of the 335 homemakers surveyed by EFNEP in Cameron County, only 56% of them thought about buying healthy food items most of the time or almost always when deciding what types of food to feed their families. Sixty-nine percent reported never, seldom, or just sometimes using nutrition facts on food labels to make better food choices. Only 48% of these homemakers had their children eat breakfast on a daily basis.

It was reported in a study of south Texas residents in 1989 that Mexican Americans consumed larger amounts of beef and organ meats than did whites or blacks (Borrud et al., 1989). Use of pork and pork products was also high among this population group. However, consumption of goat meat was not reported, even though goat meat has been associated with the Mexican American diet. It should be noted that this study was conducted in an area that was not directly on the Texas-Mexico border and conducted almost 15 years ago, thus some of the inferences may not be appropriate for describing current intake. However, the relevance of this work is rooted in understanding past diet, which may lead to the development of chronic disease over time. Breads, rolls, and tortillas (flour) are major sources of dietary fiber, energy, protein, carbohydrate, and fat. Vitamin A was supplied mostly by foods such as green beans, summer squash, and corn. Other sources of vitamin A for Mexican Americans were mixed vegetables, sweet potatoes, lettuce salads, vegetable soups, and dishes containing tomatoes. Consumption of legumes was also higher among Mexican Americans in the study than among the whites and blacks. Major contributors of vitamin C to the Mexican-American diet were fruit-flavored beverages, as well as other fortified beverages, vegetables, and chili sauces (Borrud et al., 1989).

With respect to food and nutrient intake, one important characteristic that needs to be taken into consideration is the high percentage of low-income families in the Lower Rio Grande Valley area. Investigators with the San Antonio Heart Study (Knapp et al., 1985; Haffner, Knapp, Hazuda, Stern, & Young, 1985) reported significantly lower intakes of calcium, vitamin A, vitamin C, niacin, and potassium, and higher intake of cholesterol in low-income Mexican Americans than in middle- and upper-income groups in the San Antonio metropolitan area. These intakes may also be similar in the population in Lower Rio Grande Valley because of the high percentage of people living in poverty in the area and because of the proximity of San Antonio, which is about 250 miles north.

The U.S. Department of Agriculture's 1994–1996 Continuing Survey of Food Intakes by Individuals (CSFII) provides dietary data on about 16,000 individuals nationwide. Mean quantities of foods consumed by individuals grouped by race, poverty status, and geographic regions of Northeast, Midwest, South, and West are presented in Tables 5.3 to 5.9. Differences between or among demographic groups in food consumption have not been tested for statistical significance. Differences are noted in the text for different groups, specifically the ones for Mexican Americans compared with non-Hispanic whites. It should be noted that the CSFII data are regional and could not be broken down to the county or even state level, which makes direct inferences to this region impossible.

Mexican Americans consumed smaller amounts of yeast breads, rolls, and pasta (Table 5.3) than did non-Hispanic whites; however, their intake of rice, quick breads, pancakes, French toast, and grain mixtures such as tortillas was higher. Total intake of grain products is reported to be the same in Mexican Americans and non-Hispanic whites. This table also indicates that compared with those of other regions, Southerners consumed smaller amounts of grain products and that there was not much difference with respect to poverty status in the intake of this food group.

Total intake of vegetables was lower in the Mexican-American population than it was for non-Hispanic whites (Table 5.4). Intake of all categories of vegetables, including dark green and deep yellow vegetables, lettuce, green beans, potatoes, and other vegetables, with the exception of tomatoes, was lower than that in non-Hispanic whites. The southern region ranked third among the four regions in vegetable intake, and people with lower incomes consumed smaller amounts of vegetables than did higher income groups.

With respect to fruit intake, Mexican-Americans scored better than non-Hispanic whites (Table 5.5). Fruit included citrus, apples, bananas, melons, berries, and other fruits and juices, as categorized by CSFII. Southerners consumed the smallest amount of total fruits when compared with populations in other regions, and people at or below 131% of poverty level had lower fruit intake than people at or above 350% poverty level.

Total milk and milk products intake was almost the same in both Mexican Americans and non-Hispanic whites (Table 5.6). Mexican Americans had a considerably larger

Table 5.3. Grain Products: Mean Quantities, in Grams, Consumed per Individual by Race, Poverty Status, and Region, One Day—1994–1996

Characteristics	Total	Yeast Bread and Rolls	Cereals and Pasta				Quick Breads, Pancakes, French Toast	Cakes, Cookies, Pastries, Pies	Crackers, Popcorn, Pretzels, Corn Chips	Mixtures Mainly Grain
			Total	Ready-to-eat Cereals	Rice	Pasta				
Race										
Non-Hispanic White	296	54	62	18	10	20	18	41	14	106
Mexican American	297	32	59	14	25	8	42	34	7	122
Poverty Status										
<131% Poverty	299	44	77	14	32	13	22	28	10	117
>350% Poverty	312	54	75	17	22	22	18	44	15	106
Regions										
Northeast	320	55	91	17	30	29	15	35	11	113
Midwest	311	56	64	18	14	18	15	48	15	112
South	276	45	65	14	19	13	22	37	12	96
West	317	44	84	17	35	16	23	33	12	112

Source: Data from the U.S. Department of Agriculture Continuing Survey of Food Intakes by Individuals, 1994–96.

Table 5.4. Vegetables: Mean Quantities, in Grams, Consumed per Individual by Race, Poverty Status, and Region, One Day—1994–1996

Characteristics	Total	White Potatoes		Green, Yellow, and Red Vegetables[a]						
		Total	Fried	Dark-green	Deep-yellow	Tomatoes	Lettuce	Green Beans	Mixed	Other
Race										
Non-Hispanic White	197	64	23	11	9	29	16	8	13	46
Mexican American	164	57	29	6	6	36	12	3	6	39
Poverty Status										
<131% Poverty	161	59	26	9	5	23	9	8	11	36
>350% Poverty	203	59	22	14	10	32	19	7	13	50
Regions										
Northeast	195	51	17	14	10	33	16	6	16	50
Midwest	195	73	28	9	8	27	14	8	13	43
South	189	64	27	13	7	26	13	10	14	42
West	178	52	23	11	9	29	17	4	8	46

Source: Data from the U.S. Department of Agriculture Continuing Survey of Food Intakes by Individuals, 1994–96.
[a] Lettuce *includes lettuce and lettuce-based salads and* mixed *includes corn, green peas, and lima beans.*

Table 5.5. Fruits: Mean Quantities, in Grams, Consumed per Individual by Race, Poverty Status, and Region, One Day—1994–1996

Characteristics	Total	Citrus Fruits and Juices		Dried	Other Fruits, Mixtures, and Juices					
		Total	Juices		Total	Apples	Bananas	Melons and Berries	Other Fruits and Mixtures, Mainly Fruits	Noncitrus Juices and Nectar
Race										
Non-Hispanic White	167	68	58	1	96	19	16	17	20	25
Mexican American	185	75	60	—[a]	109	20	17	18	23	31
Poverty Status										
<131% Poverty	153	67	57	1	84	14	11	13	17	30
>350% Poverty	185	78	67	1	105	21	19	20	21	25
Regions										
Northeast	200	92	80	1	106	18	17	15	19	37
Midwest	163	67	57	1	94	19	16	17	19	23
South	142	59	52	1	79	14	13	12	17	23
West	190	73	59	1	115	23	18	21	22	31

Source: Data from U.S. Department of Agriculture Continuing Survey of Food Intakes by Individuals, 1994–96.
[a] *Value <0.5 but >0.*

Table 5.6. Milk and Milk Products: Mean Quantities, in Grams, Consumed per Individual by Race, Poverty Status, and Region, One Day—1994–1996

		Milk, Milk Drinks, Yogurt							
			Fluid Milk						
Characteristics	Total	Total	Total	Whole	Low Fat	Skim	Yogurt	Milk Desserts	Cheese
Race									
Non-Hispanic White	285	232	197	49	101	43	9	30	18
Mexican American	295	268	230	146	63	12	4	12	13
Poverty Status									
<131% Poverty	290	253	211	117	67	18	3	21	13
>350% Poverty	266	212	176	37	90	47	12	31	18
Regions									
Northeast	277	228	184	74	70	34	11	28	17
Midwest	300	246	210	45	119	43	6	31	19
South	236	195	163	68	65	27	5	25	12
West	304	258	221	72	106	39	10	25	16

Source: U.S. Department of Agriculture Continuing Survey of Food Intakes by Individuals, 1994-96.

Table 5.7. Meat, Poultry, and Fish: Mean Quantities, in Grams, Consumed per Individual by Race, Poverty Status, and Region, One Day—1994–1996

							Poultry			
Characteristics	Total	Beef	Pork	Lamb	Organ	Franks, Sausages, Luncheon Meats	Total	Chicken	Fish and Shell-fish	Mixtures Mainly Meat, Poultry, Fish
Race										
Non-Hispanic White	192	24	10	1	—[a]	21	23	19	9	100
Mexican American	186	29	8	1	—[a]	16	20	18	4	106
Poverty Status										
<131% Poverty	190	24	13	1	1	24	25	22	11	89
>350% Poverty	201	24	10	—[ab]	—[a]	20	26	21	12	105
Regions										
Northeast	197	25	11	1	—[a]	22	27	23	12	96
Midwest	207	25	14	1	1	24	26	21	10	101
South	194	24	10	1	1	21	27	23	11	96
West	190	24	8	1	—[a]	17	22	18	9	107

Source: U.S. Department of Agriculture Continuing Survey of Food Intakes by Individuals, 1994–96.
[a] *Value <0.5 but >0.*
[b] *Statistically less reliable than other values because of small cell size.*

Table 5.8. Eggs, Legumes, Nuts and Seeds, Fats and Oils, Sugars and Sweets: Mean Quantities, in Grams, Consumed per Individual, by Race, Poverty Status, and Region, One Day—1994–1996

Characteristics	Eggs	Legumes	Nuts and Seeds	Fats and Oils			Sugars and Sweets		
				Total	Table Fats	Salad Dressings	Total	Sugars	Candy
Race or Ethnicity									
Non-Hispanic White	16	21	4	16	4	10	26	3	8
Mexican American	31	61	1[a]	7	1	4	16	3	4
Poverty Status									
<131% Poverty	24	27	3	10	3	5	24	4	6
>350% Poverty	16	23	4	17	4	11	25	3	8
Regions									
Northeast	14	17	4	16	5	9	23	4	6
Midwest	17	20	4	16	4	9	31	3	9
South	18	25	3	11	3	7	22	3	6
West	21	36	4	15	3	9	25	3	8

Source: U.S. Department of Agriculture Continuing Survey of Food Intakes by Individuals, 1994–96.
[a] Value <0.5 but >0.

Table 5.9. Beverages: Mean Quantities, in Grams, Consumed Per Individual, by Race, Poverty Status, and Region, One Day—1994–96

Characteristics	Total	Alcoholic			Nonalcoholic								
								Fruit Drinks and Ades			Carbonated Soft Drinks		
		Total	Wine	Beer and Ale	Total	Coffee	Tea	Total	Regular	Low Calorie	Total	Regular	Low Calorie
Race													
Non-Hispanic White	1,012	119	12	100	893	308	149	81	64	16	353	255	97
Mexican-American	703	65	3	60	638	138	58	116	101	14	319	283	36
Poverty Status													
<131% Poverty	777	76	2	69	701	180	103	125	112	12	291	258	133
>350% Poverty	1,016	125	17	99	892	308	144	83	64	18	355	236	119
Regions													
Northeast	810	98	12	80	712	260	123	89	76	12	238	168	70
Midwest	1,043	112	8	97	931	318	114	104	87	16	393	288	70
South	925	94	6	82	831	210	174	93	74	18	353	281	72
West	898	111	16	90	787	273	273	96	82	13	317	249	67

Source: U.S. Department of Agriculture Continuing Survey of Food Intakes by Individuals, 1994–96.

intake of whole milk and smaller intake of low-fat and skim milk than did non-Hispanic whites. Consumption of yogurt, milk desserts, and cheese by Mexican Americans was lower than it was in the other group. Compared with people in other regions, Southerners had the lowest intake of milk and milk products.

Total meat, poultry, and fish intake of Mexican Americans is not very different from that of non-Hispanic whites, according to the CSFII data shown in Table 5.7. Also, intake of this food group did not vary significantly by income level or by region. Mexican Americans had higher intake of eggs and legumes than did non-Hispanic whites (Table 5.8).

Mexican Americans had lower intake of alcoholic beverages and carbonated soft drinks and higher intake of fruit drinks and ades when compared with non-Hispanic whites (Table 5.9). Consumption of regular soft drinks was higher and consumption of low-calorie soft drinks was lower among Mexican Americans than among non-Hispanic whites. Southerners ranked second among people of the four regions in terms of total beverage (alcoholic and non-alcoholic) intake, and they consumed a smaller amount of alcoholic beverages than their counterparts. Lower income was associated with lower total beverage and alcoholic beverage intake.

The authors caution against liberal use of these national data to describe the Lower Rio Grande Valley residents. However, the national data serve to describe the generalities of the Mexican-American diet and possible similarities that may be identified by the Lower Rio Grande Valley Nutrition Intervention Research Initiative as it assesses the specific diet of the Lower Rio Grande Valley residents. The national data will serve as an excellent comparison to those of the valley population, and the methodology of the national survey could prove extremely useful to guide the initiative's approach to dietary assessment.

NUTRIENT INTAKE

Research studies designed with the main purpose of determining food and nutrient intake of the Lower Rio Grande Valley residents are nonexistent. Most of the studies mentioned here were designed around specific health or dietary interventions, and nutrient intake data were derived as a by-product of those efforts.

Nutrient intake of residents in the Harlingen and Brownsville area of the Lower Rio Grande Valley was reported a decade ago in the Diabetes Assessment, Nursing, Nutrition, and Dental Evaluation (DANNDE) project by Elshaw and coworkers (Elshaw, Young, Saunders, McGurn, & Lopez, 1994). A 24-hour dietary recall was used to estimate food and nutrient intake of very low income residents in the two Texas-Mexico border towns. Caloric intake at initial screening averaged 1550 and 1391 kcal/day for male participants assigned to control and experimental groups, respectively. The female participants assigned to control and experimental groups had an average caloric intake of 1123 and 1218 kcal/day, respectively. Calcium intake in all groups was inadequate when compared with the 1989 required daily allowance (RDA) of 800 mg/day. Throughout this study participants reported on 24-hour recall consuming less than 75% of the RDA for calcium. All participants met the RDA for vitamin C at screening, with the exception of men assigned to the control group. Vitamin A intake was lower than 80% of the RDA for males in the control group but adequate for all other groups. Because the current standards for comparison of intake for adequacy have changed since this report was done, the original conclusions would now be interpreted as being even more important.

To validate a food frequency questionnaire (FFQ) in 1995 for use with the low-income Mexican-American population residing in Starr County, McPherson and colleagues (McPherson, Kohl, Garcia, Nichaman, & Hanis, 1995) collected three-day food record data to describe the intake of the residents. The reported intake for the 33 individuals was: energy, 1929 kcal/day; total fat, 36% kcal; saturated fat, 12% kcal; polyunsaturated fat, 7% kcal; monounsaturated fat, 14% kcal; and cholesterol, 454 mg/day. The intakes assessed by a three-day food record as the measure of truth were highly correlated with the FFQ. The authors attribute the high correlations to the lack of diversity in the diet of Starr County residents, a factor eliminating much of the variation in the diet and increasing the probability of agreement. These data suggest that the diets of the residents were higher than recommended for dietary fat (36% kcal versus 30% kcal) and saturated fat intake (12% kcal versus 10% kcal).

Some studies have looked at food and nutrient intake of Mexican Americans living on the United States–Mexico border with the purpose of estimating dietary or supplemental folic acid intake because of the role the vitamin plays in preventing neural tube defects. Low-income Mexican-American women from four border counties (Cameron, El Paso, Hidalgo, and Webb) enrolled in the U.S. Department of Agriculture's nutrition program for women, infants, and children (WIC) consumed beans, orange juice, and milk as their main sources of folic acid (Suarez, Hendricks, Cooper, Sweeney, Hardy, & Larsen, 2000). In this case-control study, the investigators determined dietary and supplemental folic acid intake and its role in prevention of neural tube defects. Only 2% of the women were using folic acid supplements in these border counties. Combined folic acid intake from diet and supplements showed a modest risk reduction for neural tube defects for intakes of ≥ 1.0 mg/day. The decreased effect of folic acid in reducing the risk of neural tube defects has been attributed to the fact that in these women the primary source of folic acid was in the form of dietary polyglutamates rather than the more easily absorbed supplemental monoglutamates.

In a related study, authors reported declining levels of erythrocyte folic acid during the postpartum period among Hispanic women living in El Paso. Daily dietary folic acid intake ranged from 8 µg/day to 979 µg/day, with a mean of 269 µg/day. Ninety-two percent of the women did not obtain the recommended daily amount of folate (400 µg) for postpartum women. The authors suggest that women of childbearing age should comply with the U.S. Public Health Service recommendation of 400 µg folic acid intake daily (O'Rourke, Redlinger, & Waller, 2000).

FOOD INTAKE AND WEIGHT IN CHILDREN AND ADOLESCENTS

Results from investigations in the Lower Rio Grande Valley are available through published work and directly from investigators. Dietary intake of 29 boys and girls ranging in age from 6 to 11 years living in a *colonia* in Pharr from two- or three-day food records were collected by nursing professor Eloisa Tamez, Ph.D., R.N., of The University of Texas–Pan American and her colleagues (Tamez, personal communication by e-mail, January 30, 2004). Pharr, with an approximate population of 50,000, is two miles east of McAllen in Hidalgo County at the intersection of Interstate 45 and U.S. 83. Dietary records were obtained during summer when public school was not in session and, therefore, reports did not include school lunch or breakfast meals. Results of the analysis are reported in Table 5.10 and compared with estimates reported from NHANES III data for children 6 to 11 years of age (Wright, Wang, Kennedy-Stephenson, & Ervin, 2003). Table 5.10 indicates that the energy intake of the children in this area is approximately 75% of the national average and that only 63% of their energy goal was met. The children also had suboptimal intakes of such essential nutrients as calcium, folate, iron, and zinc, deficits that may lead to slower growth and higher morbidity

Table 5.10. Dietary Intake of Children 6 to 11 Years of Age—Pharr, Texas, and United States

Nutrient	Pharr, Texas (Mean ± SD)	United States (Mean ± SD)
Energy (kcal)	1526 ± 425	2025 ± 1681
Kcal (% goal)	63 ± 24	—
Protein (% calories)	14.6 ± 3.5	13.2 ± 7
Carbohydrate (% calories)	55.0 ± 8	55.2 ± 15
Total fat (% calories)	31.0 ± 6	32.9 ± 13
Saturated fat (% calories)	11.9 ± 3.2	11.7 ± 7
Cholesterol (mg)	217 ± 99	212 ± 214
Calcium (mg)	752 ± 345	889 ± 968
Folate (µg)	207 ± 65	339 ± 375
Iron (mg)	10.4 ± 3.3	14.4 ± 13.6
Zinc (mg)	6.9 ± 2.4	10.6 ± 10.5
Sodium (mg)	2129 ± 637	3255 ± 3886

Source: Data for Pharr, Texas, from Tamez in personal communication (2004) and data for the United States from NHANES III for children 6 to 11 years of age (Wright et al., 2003).

Harold H. Sandstead, M.D., of The University of Texas Medical Branch in Galveston and colleagues (Sandstead, personal communication by e-mail, January 31, 2003), working with 359 low-income children, six to nine years of age from Brownsville, reported that about 50% were zinc deficient and 25% were iron deficient. The children participated in a 10-week double-blind controlled trial in which they were randomized to take a placebo daily, 20 mg zinc daily plus micronutrients, 24 mg of iron daily plus micronutrients, or other micronutrients. Subjects were offered breakfast and lunch at school and reported frequencies of consumption of foods at home. Results suggested that the diets of more than 40% were low in red meat and rich in corn tortilla and *frijoles* (well-known sources of phytate, fiber, and some other inhibitors of zinc and iron absorption). Improvements in height, weight, knee height, and cell-mediated immunity were observed in the group receiving zinc and other micronutrients but not in the other groups. The authors conclude that even though the meals children were offered at school were efficacious for their zinc and iron status, they provided amounts insufficient to overcome the deficits in the home diet.

In 2001, Robert Roberts, Ph.D., from The University of Texas School of Public Health at Houston, conducted a Youth Risk Behavior Survey in the Lower Rio Grande Valley. During the 2000–2001 school year, there were a total of 40 high schools in the Lower Rio Grande Valley, which enrolled more than 21,500 students in the ninth grade. After stratifying these schools by county, number of schools in the district, and enrollment, a two-stage cluster sampling design was used to select 18 of these schools for the survey. The first stage consisted of school districts, and the second stage consisted of high schools. Thirteen of the 18 high schools participated in the survey (72%). Of the 7,642 eligible ninth-grade students from the 13 high schools, 5,118 completed self-administered questionnaires (67%) for an overall response rate of 48%. For comparison we used the 2001 Texas Youth Risk Behavior Survey completed by 63% of students in grades 9 to 12 (Texas Department of Health, 2002).

Self-reported weight and height were used to calculate body mass index (BMI). At risk of being overweight was defined as a BMI between the 85th and 95th percentile for age and gender, while overweight was a BMI at or above the 95th percentile for age and gender. For the most part, Lower Rio Grande Valley girls and boys were more likely to be at risk of being overweight and overweight than Texas adolescents (Table 5.11) (Figures 5.1 and 5.2). Boys in the Lower Rio Grande Valley and Texas had a higher prevalence of overweight than girls in the Lower Rio Grande Valley or Texas; however, boys were less likely than girls to describe themselves as slightly or very overweight, and boys were less likely than girls to be trying to lose weight.

Methods used to lose or to keep from gaining weight during the past 30 days differed between the Lower Rio

Table 5.11. Youth Risk Behavior Survey—Lower Rio Grande Valley and Texas, 2000–2001

	Lower Rio Grande Valley (N = 5,118)		Texas (N = 7,067)	
Weight and Weight Control Characteristics	**Girls (%)**	**Boys (%)**	**Girls (%)**	**Boys (%)**
Weight				
At risk of overweight	18	19	14	15
Overweight	14	18	9	19
Self-described as slightly or very overweight	38	28	37	25
Self-described as trying to lose weight	63	41	63	33
Weight Control				
Exercising	67	61	67	52
Eating less food, fewer calories, or low-fat food	51	30	58	29
Not eating for 24 hours or more	21	10	20	8
Using diet pills, powders, or liquids without doctor's advice	10	7	13	6
Vomiting or taking laxative	11	5	9	3

Source: Data from survey during 2000–2001 school year by Robert Roberts, Ph.D., of Lower Rio Grande Valley ninth-grade students and from the 2001 Texas Youth Risk Behavior Survey (Texas Department of Health, 2002).

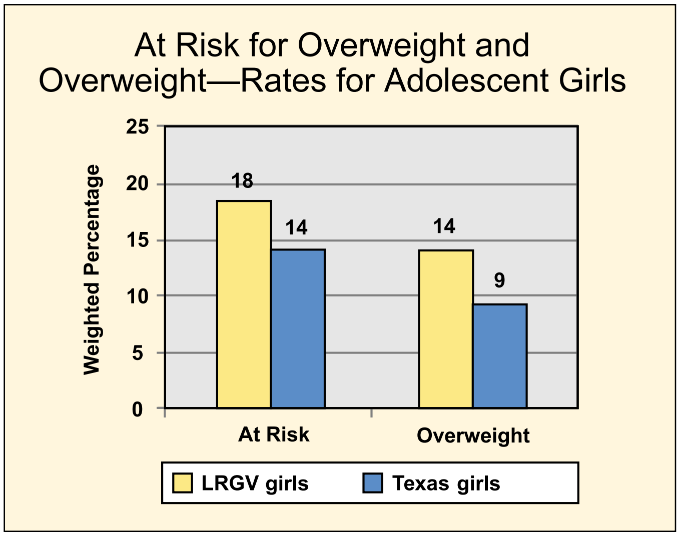

Figure 5.1. *In adolescent girls, rates for being at risk of overweight and rates for overweight are higher in the Lower Rio Grande Valley (LRGV) than in Texas.*

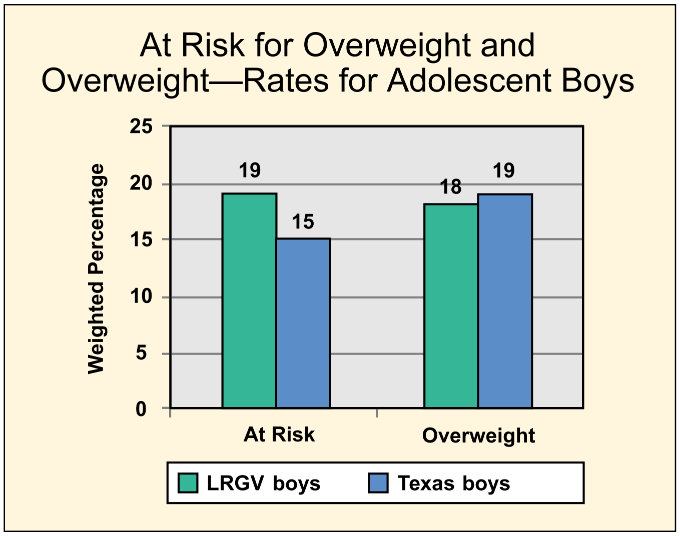

Figure 5.2. *In adolescent boys, rates for being at risk of overweight are higher in the Lower Rio Grande Valley (LRGV) than in Texas, whereas rates of overweight are higher in Texas overall than in the valley.*

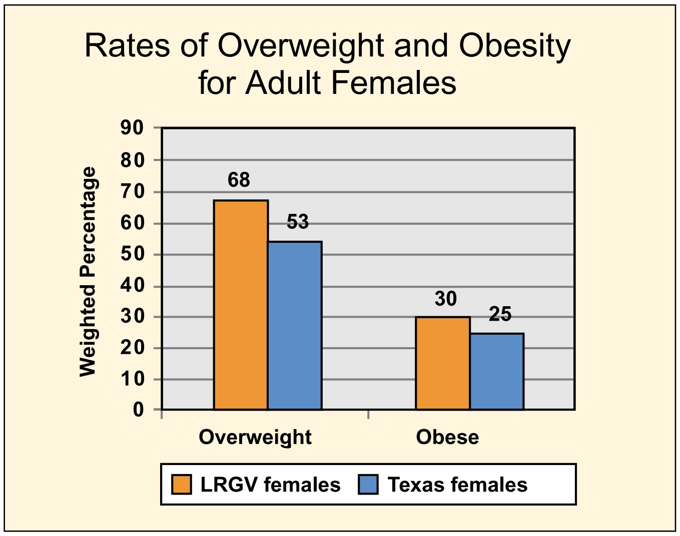

Figure 5.3. *Rates of overweight and obesity for adult females are higher in the Lower Rio Grande Valley (LRGV) than they are in Texas.*

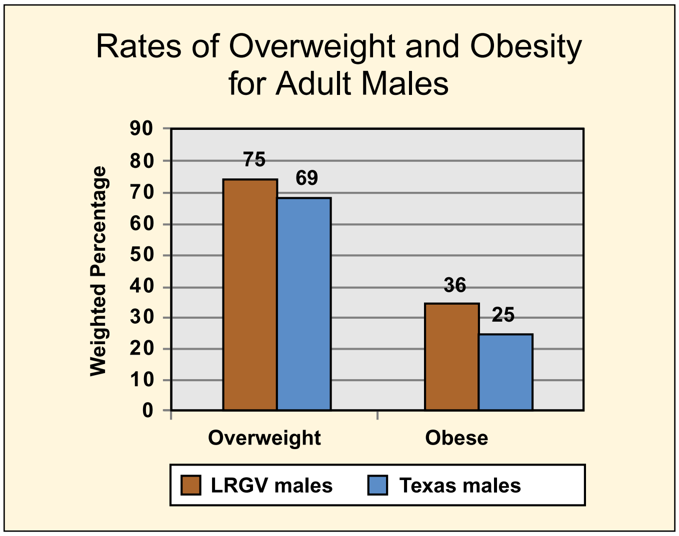

Figure 5.4. *Rates of overweight and obesity for adult males are higher in the Lower Rio Grande Valley (LRGV) than in Texas, and such rates are generally higher in adult males than in females.*

Grande Valley and Texas, and between girls and boys. The highest percentage among both was for exercise; followed by eating less food, fewer calories, or foods low in fat; followed by not eating for 24 hours or more; followed by using diet pills, powders, or liquids without a doctor's advice; and, lastly, vomiting or taking a laxative. (For additional information about overweight and obesity, see the Obesity section in chapter 6.)

ADULT FOOD INTAKE AND WEIGHT: BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM

In 2001, the Texas Department of Health's Office of Border Health conducted a Behavioral Risk Factor Surveillance System survey in seven border counties (personal communication from the Texas Department of Health, Office of Border Health, R. J. Dutton, director, by e-mail on September 9, 2002). Random digit dialing was used to select 910 adults (ages 18–99 years) to complete a telephone interview in Cameron, Hidalgo, and Starr counties, reflecting the population of 623,947 adults residing in those counties. For comparison, we used the 2001 Texas Behavioral Risk Factor Surveillance System, consisting of 5,916 adults reflecting 15.2 million persons residing in the state (personal communication from the Texas Department of Health, Texas Behavioral Risk Factor Surveillance System, Jimmy Blanton, epidemiologist/coordinator, by e-mail on January 6, 2003).

Self-reported weight and height were used to calculate BMI. Overweight was defined as a BMI of 25 or greater and obese was defined as a BMI of 30 or greater (those who are obese make up a subset of those who are overweight). As was the case for adolescents, Lower Rio Grande Valley adults were more likely to be overweight and obese than were Texas adults. The prevalence of overweight was higher among men (75%) than women (68%) Lower Rio Grande Valley residents and was higher among men (69%) than women (53%) Texas residents (Figures 5.3 and 5.4). Both the adolescent and adult prevalence measures may be underestimated since they were based on self-reported height and weight.

Only 6% of Lower Rio Grande Valley residents compared with 23% of Texas residents reported they consumed five servings of fruits and vegetables the day prior to the interview. In both the Lower Rio Grande Valley and Texas, fruit and vegetable consumption was higher among females (Lower Rio Grande Valley, 8%; Texas, 28%) than males (Lower Rio Grande Valley, 3%; Texas, 19%). A limitation of this comparison is that different questions were asked regarding diet on the border and statewide interviews, and data from 2000 rather than 2001 were used for Texas.

NUTRITION INTERVENTIONS AND CULTURAL COMPETENCE

Inasmuch as the nutrition status of residents of the Lower Rio Grande Valley remains inexplicitly delineated, undertaking research studies aimed at better characterizing food and nutrient intake and identifying appropriate interventions through such research may be the logical next step. Programs and services that aim to improve the health and nutrition of residents in the Lower Rio Grande Valley may be expected to be more effective if they are linguistically and culturally competent and tailored to the health beliefs, norms, and practices that shape the lifestyle, cultural values, and health needs of the Hispanic population. To be culturally competent, programs must be associated with behaviors, attitudes, and policies congruent with those of the population and be evident in cross-cultural situations (Cross, Bazron, Dennis, & Isaacs, 1999).

Several studies have shown that culturally appropriate health care interventions can have an impact on weight loss and caloric consumption of Mexican American individuals (Cousins et al., 1992; Elshaw et al., 1994; Foreyt, Ramirez, & Cousins, 1991). Culturally competent interventions may also result in reducing the prevalence and severity of diabetes and other chronic diseases (Agency of Healthcare Research and Quality, 2001; Brown & Garcia, 2002; Brown & Hanis, 1995; Brown, Upchurch, Garcia, Barton, & Hanis, 1998).

Research conducted in the Lower Rio Grande Valley has determined the effectiveness of culturally competent programs to improve diet and to decrease weight among Mexican Americans. Elshaw et al. (1994), as described above, conducted in Brownsville and Harlingen in Cameron County a study with a group of elderly Mexican Americans. What wasn't mentioned above is that they found that a culturally specific, intensive diabetes education program can have an impact on weight loss, improved caloric distribution, and decreased cholesterol levels. Brown and Garcia (2002) implemented a culturally competent diabetes self-management intervention in Starr County among Mexican Americans with type 2 diabetes. This intervention focused primarily on diet and self-monitoring education. Brown and Garcia found that a culturally competent program improves health outcomes of Mexican Americans, particularly for those individuals with HbA 1c levels over 10%. Characteristics of such programs included employing bilingual Mexican-American nurses and dietitians from the community; using videotapes filmed within the community that showed community leaders describing their experience with diabetes; focusing on realistic health recommendations consistent with Mexican-American preferences, especially in dietary choices; and offering the programs in the audience's preferred language (Brown, Garcia, Kouzekanani, & Hanis, 2002). Offering such programming is already the aim of a number of community-based organizations in the Lower Rio Grande Valley, but, no doubt, more extensive efforts would benefit the community.

SUMMARY

Limited published information is available on food and nutrient intake of Lower Rio Grande Valley residents. Comparison of the available information with the data from the U.S. Department of Agriculture's CSFII shows many similarities between dietary habits of Mexican Americans living in the valley and those living in other parts of the United States. Data indicate inadequate intake of calories and essential nutrients, poor nutritional status, and poor dietary habits thought to be consequences of food insecurity, lack of nutritional knowledge, and other factors in at least some areas of the valley. Definitive research studies aimed at identifying food and nutrient intake and cataloging supplement use are needed in this population.

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