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Contemporary diet and body weight of Navajo women receiving food assistance: An ethnographic and nutritional investigation

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Abstract Preceded by 6 months of ethnographic research, a survey of 107 Navajo women, primarily food assistance participants, was conducted to describe and evaluate the contemporary Navajo diet. On the basis of results of 1-day dietary recalls, mean nutrient intakes were found to be below the RDA for calcium, phosphorus, iron, vitamin A, and energy. Sixty-three percent of the women in the sample were overweight or obese. The overall percentages of energy from fat, carbohydrate, and protein were closer to those recommended in the Dietary Goals than those in the current U.S. diet. The fat in the diet appeared to be primarily saturated, however, and fiber intake was lower than the U.S. average. Traditional foods were infrequently consumed. Women with higher incomes tended to have better diets. Commodity foods supplied by USDA's Food Distribution Program provided 43% of caloric intake and 37% to 57% of the intakes of all other nutrients except fat and vitamin C for the 72% of the sample participating in that program. It is concluded that the Food Distribution Program provides an important nutritional contribution to the contemporary Navajo diet. *J Am Diet Assoc 88:822, 1988.*

Native American diet and life-style have changed greatly over the course of this century. Chronic diseases have replaced infectious diseases as major causes of death. Today, at least four of the 10 leading causes of American Indian and Alaska Native deaths are nutrition-related: heart disease, cancer, cirrhosis, and diabetes. In addition, nutritional factors may contribute to the increasing prevalence of overweight, obesity, hypertension, and dental caries. Nonetheless, there is little information on the current nutritional status or dietary patterns of this population (1). The present study was undertaken to describe and evaluate the contemporary diet of one Indian group, the Navajo.

The Navajo Nation is the largest Native American tribe in the United States, both in land area and in population

(2). The reservation is located in parts of Arizona, New Mexico, and Utah and covers 26,000 square miles. The Navajos now number more than 170,000 on the reservation, plus many more in major cities across the country. Population growth is expected to continue.

The health pattern of the Navajo is similar to that described for all American Indians, with a higher prevalence of obesity, dental caries, and diabetes than in the remainder of the United States (3). Although the cardiovascular disease death rate is still lower than the U.S. average, the incidence of heart disease is increasing. In 1982, circulatory problems moved for the first time into the top 10 leading causes of admissions to Navajo Area Indian Health Service hospitals (3).

On the reservation, some Navajos live in scattered small towns, but most live in isolated homesteads of several related households, surrounded by acres of dry land. Many Navajos still herd sheep and practice part-time farming. Unemployment is high. There are few paved roads, and most of the rural homes have no running water or electricity. Factors such as those are often related to nutritional status. For example, Butte et al. (4) identified lack of transportation, refrigeration, fuel, and running water as factors contributing to the nutritional deficiencies of pregnant and lactating Navajo women. The present study uses a combination of ethnographic methods of anthropology and survey methods of nutrition to examine, in detail, the current dietary patterns and nutrient intake of the Navajo and some of the related social and ecological factors.

Method

Ethnographic data on the current foodways of the Navajo were collected by the first author (W.S.W.) during 6 months of fieldwork (including living with a Navajo family) on the Navajo reservation in 1979 and 1980. The ethnographic methods used consisted of participant observation and in-depth, semi-structured, tape-recorded interviews with a small number of key informants. The ethnographic results have been published elsewhere (5). Factors that appeared to be related to Navajo diet and nutritional status were identified from the ethnographic data and used to generate hypotheses and questions for a larger-scale survey. The survey, conducted in the summer of 1982, consisted of structured interviews using a written questionnaire completed by the investigator.

The sample was obtained from those attending federal food distributions on the reservation. The USDA Food Distribution Program provides federally donated surplus commodity foods and nutrition education once each month to eligible Navajo and other Indian families. It has been administered on the Navajo reservation since 1958 (6). In 1982, the monthly food package consisted of canned meats, canned and dry beans, dehydrated eggs and potatoes, peanut butter, evaporated and nonfat dry milk, cheese, pasta, rice, oats, cornmeal, flour, canned vegetables, canned fruits and fruit juices, butter and shortening, corn syrup, and raisins.

Nineteen distribution sites were selected for the study. They were chosen to cover as much of the reservation as possible within the scheduled travel times of five paraprofessional nutrition workers with whom the investigator attended the distributions. One hundred seven Navajo homemakers volunteered and were interviewed. Homemakers were chosen as the study population on the assumption that their diets usually reflect their families' food intakes. Women of a wide age range were interviewed, since many Navajos live in extended family units and grandmothers as well as young mothers have significant influence over the family diet.

The survey consisted of one 24-hour recall, measures of height and weight, and questions on several social and ecological factors thought to be related to diet. The 24-hour recall method was used because it is noninvasive, does not require literacy, should not alter eating habits, and requires little time or cooperation by the subject (7). In addition, although the method is not accurate for estimating representative food intakes of individuals, it provides a valid estimate of average nutrient intakes and typical dietary patterning of a group (8).

All dietary recalls and interviews were obtained by the first author, with one of the five paraprofessional nutrition workers interpreting when necessary. An assortment of dishes and utensils was used to help the subjects quantify their intakes. The investigator also measured all heights and weights.

Analysis

Intakes of energy, protein, fat, carbohydrate, fiber, calcium, phosphorus, iron, vitamin A, vitamin C, thiamin, riboflavin, and niacin were calculated from the 24-hour recalls using the Ohio State University nutrient data bank. Nutrient values of traditional Navajo foods (9) were added to this database. Nutrient intakes were calculated as mean, median, and percentage of the 1980 Recommended Dietary Allowances (10) for women aged 19 to 22, 23 to 50, and 51 or older.

The contribution of commodity foods to nutrient intake was examined by coding each food in a recall as either a commodity or a non-commodity food. That information was not always specifically obtained, however, and therefore the following two assumptions were made for the recalls of commodity food recipients: (a) All foods that were known commodity food items were assumed to be such. (b) All homemade tortilla and fry bread were assumed to be made from commodity flour (and commodity nonfat dry milk if said to be made with dried milk), and were therefore coded as commodity foods. Those assumptions seemed reasonable since the ethno-

Table 1. Percentages of Metropolitan Life standard ("ideal") weights according to height for women (12), for 107 Navajo women*

% standard weight	% of sample
80 to 99	11.2
100 to 119	23.4
120 to 139	38.3
140 to 159	18.7
160 and above	8.3

*Mean percentage of standard weight is 128%.

graphic research suggested that recipients did not usually spend their own food dollars to buy the same foods they received through the program.

Bivariate correlational analysis (11) was used to explore relationships between nutrient intake and the social and demographic variables. Degree of overweight was calculated as percent of standard weight, using the Metropolitan Life standards (12) to control for height and sex.

Results and discussion

Sample profile

The mean age of the 107 women surveyed was 47 years; ages ranged from 20 to 90 years. Subjects had attended school an average of 6 years, with 28% having received no formal education. Households consisted of an average of five members, with 32% of subjects living in extended families. Thirty percent of the households were headed by a woman. Most of the women in the sample lived in the rural parts of the reservation; 9% lived in reservation towns. The distance to the nearest food store ranged from 1 to 35 miles and averaged 6 miles. Household dwellings were generally small, with an average of four rooms each, and 23% of the sample lived in the traditional one-room home called a "hogan." Twenty-nine percent of the sample had spent at least 2 years living off of the reservation, mostly to attend boarding school or training programs or to find work.

The mean height of the women sampled was 156 cm, reflecting the generally short stature of the Navajo. As detailed in Table 1, 63% were overweight, defined as more than 120% of their ideal body weight by the Metropolitan Life standards (12). This is a dramatic increase from the 15% prevalence of obesity reported in 1955 in a study (13) of Navajo women aged 15 to 45 years (using the 1939 "Baldwin-Wood" weight standards).

Seventy-two percent of the sample were Food Distribution Program (FDP) recipients, with an average length of program enrollment of 6 years. Another 10% were at the distribution site to apply for the program at the time they were interviewed. Seven percent were Food Stamp recipients, and 11% received no food aid because they had higher incomes. The mean reported income was \$6,000 per household per year or \$1,350 per capita per year. This compares with the U.S. 1982 poverty guideline of \$10,840 for a household of five. Sixty percent of the households had no currently employed member. The average percent of income spent on food was 48%, whereas in the U.S. as a whole, only 10% to 40% of

income was spent on food in 1982 (14). The mean per capita weekly food expenditure for the Navajo families was \$10.25.

Fifty-two percent of the sample households had no indoor plumbing. The families obtained water from wells or public buildings, usually some distance away, and then stored it in large barrels outside the house. Forty-three percent had no electricity or refrigeration, and 20% had only wood-burning stoves with which to cook. Fifty-five percent had functioning television sets. Houses were generally crowded, with a mean of two persons per household room. Thirty-one percent of the households owned no vehicle.

Fifty-two percent of the households had gardens. Indian corn, squash, and melon were the most frequently cultivated, or "core," crops. Most gardens were small, and thus no longer appeared to be major sources of food for many families. Fifty-three percent of the women sampled owned livestock. Among those women, an average of 35 sheep were owned per woman. Eighty percent of the women in the sample still home-butchered sheep, even if they did not own their own herd. Nearly half the sample butchered a sheep at least once a month.

Radio and television appeared to be the major sources of information other than word of mouth. While most of the sample said they never read a newspaper (32% read one daily or weekly), 90% regularly listened to the radio, and 62% regularly watched television. (Some women without television sets watched frequently at the homes of relatives or friends.)

Pervasiveness and changing trends in the Navajo diet

Current diet and meal patterns

Food items were tabulated by the number of recalls in which they were found to help determine consistencies in the contemporary Navajo diet pattern. Coffee, Navajo tortilla or fry bread, potatoes, eggs, and sugar (usually in coffee or tea) were the most common items in the diets, being found in more than half of the 107 one-day recalls. Navajo tortilla and fry bread are homemade breads made from white wheat flour, baking powder, salt, and water. Commodity instant nonfat dry milk is often added to the dough, a practice reportedly begun by health workers in the 1950s (6) and probably the major way in which this commodity food is used. Other common items in the diet, consumed in 30% to 50% of the recalls, included sweetened drink mixes or soda pop, store-bought bread, fresh mutton, beef, and canned or fresh milk (mostly in coffee). Consumption of butter or margarine, bacon, luncheon meat, chicken, and tea was reported in 20% to 30% of the recalls. Consumption of lettuce, canned green beans, "snack foods," pasta, dry beans, and orange juice was reported in about 15% of the recalls.

Three cooked meals a day were generally eaten. Bread was a part of every meal. Breakfasts were commonly eaten and usually consisted of fried eggs, fried potatoes, and sometimes bacon or other meat. The noon and evening meals usually consisted of one boiled (i.e., stew or beans) and one fried or roasted meal each day. Several meals were eaten at fast-food restaurants, which have reached some reservation towns, and a number were skipped, mostly in stated attempts to lose weight.

Traditional food use

Use of most traditional Navajo foods was infrequent (9). Mutton, tortillas, and fry bread were the major traditional foods consumed. Other traditional foods consumed by a few women included wild Navajo tea, 8 recalls; blue cornmeal mush with ash, 7; yellow cornmeal mush, 6; hominy corn, 3; Navajo pancake, 2; wild sumac berry pudding, 2; and goat's milk, 1. This pattern appears to be similar to the "occasional" use of traditional foods by Navajos reported by Alford and Nance (15) in 1976.

Nutrient intake profile and its variability

The dietary patterns just discussed provide some information regarding the quality of the Navajo diet. Also of interest was how the patterns were manifested quantitatively into nutrient intake. The mean and median intakes of the women for 13 nutrients are presented in Table 2, along with the mean percent of the Recommended Dietary Allowances for 10 nutrients.

As the standard deviations in Table 2 show, intake varied widely for most nutrients. The mean nutrient intakes were below the RDAs for energy, calcium, phosphorus, iron, and vitamin A, while they met or exceeded the RDAs for protein, thiamin, riboflavin, niacin, and vitamin C.

Vitamins and minerals

Calcium intake averaged 73% of the RDA, with 61% of the sample consuming less than two-thirds of the RDA. This low calcium intake appears to be related to a low consumption of dairy products. As shown in Table 3, 67% of the sample consumed none or less than half a serving from the milk group on the day of the recall, and another 25% consumed only one milk group food.

The major source of calcium, as shown in Table 4, was the bread group, due to the common addition of commodity dry milk to Navajo tortillas and fry bread. This probably explains the high contribution of commodity foods to calcium intake, 57%, also shown in Table 4. Traditionally, the major sources of calcium were goat's and sheep's milk and the culinary ash used in many corn dishes (9). They do not appear to have been replaced in the modern diet by similar good sources of calcium.

The mean percent of RDA for iron was 82, fairly adequate, partly because of the reduced iron requirement of women over 50 years, who made up almost half the sample. Eighty percent of the sample consumed at least two servings from the meat group and at least four servings from the bread group on the day of the recall (Table 3). As shown in Table 4, the meat group and the bread group each contributed 38% of the iron intake. Canned meats, dry beans, and enriched pasta and grains from the Food Distribution Program probably accounted for most of the 46% of iron intake contributed by commodity foods (Table 4).

Vitamin A and C intake varied considerably, as is typical for those nutrients. The mean intake for vitamin A was 76% of the RDA, but almost half of the sample consumed less than one-third of the RDA. Mean vitamin C intake appeared adequate, at 105% of the RDA. However, this high mean resulted from several very high intakes, and more than half of the sample had vitamin C intakes of less than two-thirds of the RDA.

Fruits and vegetables, as expected, were the major sources of vitamins A and C in the diet (Table 4) but were infrequently consumed. As shown in Table 3, only 4% of the sample consumed the recommended four servings from the fruit and vegetable group, while 68% consumed two servings or less. The most frequently consumed fruit or vegetable was potato. Only 22% and 30%, respectively, of the women consumed a high vitamin A or high vitamin C food on the day of their recall (Table 3). Although eight canned vegetables, seven canned fruits, and four canned juices are included in the Food Distribution Program, only a few of them are very high in vitamins A or C. Commodity foods contributed least to those nutrients (Table 4).

Energy intake and its components

Mean caloric intake was 82% of the RDA (Table 2), although most of the women in the sample were overweight. This probably reflects the low activity and exercise levels observed (but not measured) in the ethnographic fieldwork and is similar to reports on other Native American groups (16). Commodity foods contributed 43% of energy, which is similar to the 45% contribution estimated by McDonald (6) in 1965, although the foods have increased in variety since then. As shown in Table 4, the major source of energy was the bread group (37% of intake), followed by the meat group (29%) and the vegetable group (18%), which included the commonly consumed fried potatoes.

Fat intake, on the other hand, came mainly from the meat group (50% of intake), with some contribution from the bread group (18%) and the vegetable/fruit group (16%, again including fried potatoes). Only 29% of the fat intake came from commodity foods, the lowest percent contribution to any nutrient intake except vitamin C. This suggests that commodity foods supply nutrients without supplying large amounts of fat.

Table 2. Mean nutrient intakes of 107 Navajo women and comparison with 1980 Recommended Dietary Allowances (10)

nutrient	intake		mean % RDA	cumulative %	
	mean	median		<1/3 RDA	<2/3 RDA
energy (kcal)	1,632 ± 610*	1,542	82	4	31
protein (gm)	65 ± 30	61	149	0	7
fat (gm)	56 ± 27	53	—	—	—
carbohydrate (gm)	220 ± 88	205	—	—	—
fiber (gm)	3.1 ± 1.9	3.0	—	—	—
calcium (mg)	574 ± 359	470	73	19	61
phosphorus (mg)	685 ± 395	596	86	11	40
iron (mg)	11.5 ± 5.1	10.0	82	8	44
vitamin A (IU)	3,025 ± 3,263	2,099	76	42	63
thiamin (mg)	1.2 ± 0.6	1.1	118	0	19
riboflavin (mg)	1.5 ± 1.1	1.2	127	2	24
niacin (mg)	15.8 ± 8.0	14.4	121	2	15
vitamin C (mg)	62 ± 72	37	105	22	53

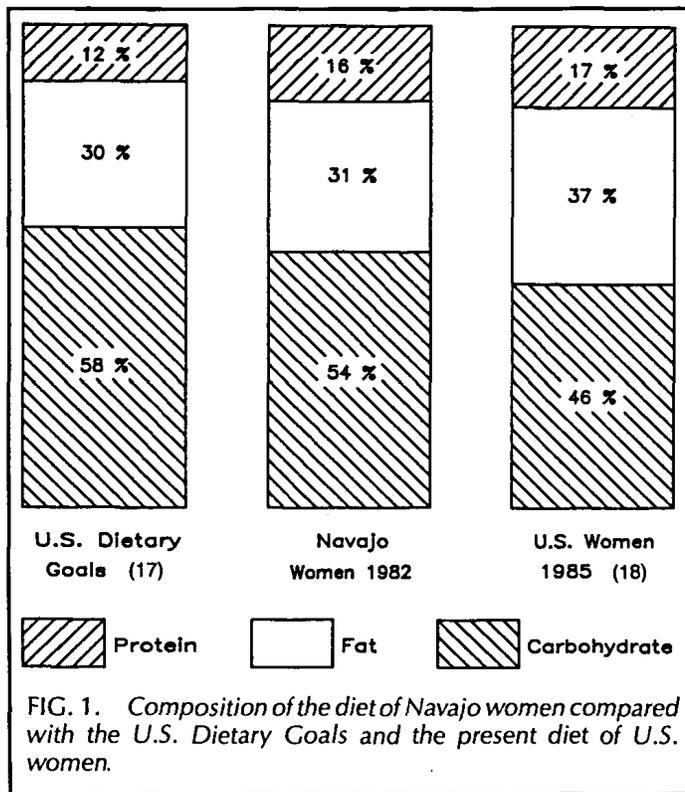
*Mean ± standard deviation.

Table 3. Percentages of 107 Navajo women consuming up to the minimum recommended two servings of meat and milk groups, four servings of bread and vegetable/fruit groups, and one serving of high vitamin A and high vitamin C foods, in 1-day dietary recalls

food group	servings				
	0	1	2	3	4
	← % →				
milk	67.3	25.2	7.5		
meat	3.7	18.7	77.6		
bread	0.0	1.9	8.4	10.3	79.4
vegetable/fruit	7.5	27.1	33.6	28.0	3.7
high-A	78.5	21.5			
high-C	70.1	29.9			

Table 4. Mean contribution to total nutrient intakes from five food groups for 107 Navajo women and from commodity foods for the 73 FDP recipients

nutrient	food group					
	milk group	meat group	veg/fruit group	bread group	"other" group	commodity foods
	← % →					
energy	4.8	28.8	17.7	37.0	11.8	43.1
protein	7.0	55.0	9.4	27.4	1.0	40.8
fat	9.5	50.3	15.5	17.7	7.5	29.4
carbohydrate	2.1	5.4	23.4	52.0	17.2	52.7
fiber	0.0	12.7	60.5	20.6	2.0	41.6
calcium	19.3	14.1	12.2	52.1	2.3	57.1
phosphorus	15.6	41.7	22.1	15.7	4.9	38.4
iron	0.2	37.8	22.0	37.5	1.6	46.1
vitamin A	12.8	25.8	48.5	6.2	5.8	36.5
thiamin	3.2	22.9	19.3	53.4	1.2	53.3
riboflavin	16.2	34.3	11.6	36.1	1.7	49.5
niacin	0.6	43.6	20.4	33.7	1.6	37.0
vitamin C	5.2	4.5	81.1	1.9	3.6	27.5



The "other" group, consisting mostly of concentrated fats and sweets, contributed only 8% of the fat intake, reflecting the observed low intake of high-fat snack foods. On the other hand, the group contributed 17% of carbohydrate intake, reflecting the observed high intake of sweetened drinks, such as sweetened drink mixes and soda pop.

Since no RDAs have been established for fat and carbohydrate, the energy-yielding components of the diet were compared to the U.S. Dietary Goals (17) and the present U.S. diet (18), presented in Figure 1. As shown, the Navajo diet appeared to be closer to the Dietary Goals than the present U.S. diet, although the lower overall caloric intake must be kept in mind.

As shown, the percent of energy as fat was similar to that recommended. However, both the foods in the dietary recalls and the ethnographic research suggested that nearly all of the fat was saturated. The food composition data were insufficient to quantify this, but most frying was done in lard or commodity shortening or butter, and less than 4% of the recalls mentioned vegetable oil other than in mayonnaise (reported in 11% of the recalls). The Dietary Goals recommend that only one-third of fat intake be saturated. The Navajo's high saturated fat intake may contribute to the increasing incidence of heart disease (3).

Carbohydrates made up 54% of the sample's caloric intake, close to the 58% recommended in the Dietary Goals and higher than the percentage in the present U.S. diet. However, the Dietary Goals also recommend that 48% of calories be from complex carbohydrates and only 10% from refined carbohydrates. The Navajo do not appear to meet that recommendation. Whole wheat bread or other whole grains (oatmeal, blue cornmeal mush)

were reported in less than 10% of the recalls, and fresh fruits and vegetables were infrequently consumed (Table 3). Although fiber data in food composition tables are still incomplete, the mean crude fiber intake of the sample (Table 2) was estimated to be 3 gm/day, lower than the 4 gm/day estimated for the American diet in 1974 (19). This low fiber intake may be of concern, especially with the suggested link between fiber and control of diabetes (20), a common health problem among the Navajo and other Native Americans.

Relationship of socioeconomic variables to nutrition

Although one 24-hour recall is not necessarily representative of the dietary status of an individual, in a large sample, correlational analysis can be used to determine whether there is a trend toward better diets, as indicated by one recall, to be associated with certain demographic and socioeconomic variables. Income was the only variable to show a strong relationship to most of the dietary variables examined. Household income was positively correlated with nine of the 12 nutrients examined ($p < .05$, coefficients from 0.17 to 0.27). Of the other variables, age was negatively correlated, while education, newspaper use, and the planting of non-core or non-traditional vegetables (those in addition to corn, squash, and melons) were positively correlated with vitamin A intake ($p < .05$). Finally, the use of traditional foods was positively correlated with intakes of calcium, carbohydrate, and thiamin ($p < .05$).

Income thus explained the greatest amount of variation in dietary status among Navajo women. However, income was itself significantly correlated with a number of the other variables, and thus women with better diets tended not only to have higher incomes but also to be younger, better educated, and more likely to read newspapers, to have better housing conditions, to live nearer to food stores, to have greater off-reservation experience, and to plant home gardens with a greater variety of vegetables. Higher income may be seen as representing an underlying dimension common to all of these factors.

Implications

The mean nutrient intake of Navajo women was found to be below the RDA for vitamin A, vitamin C, calcium, iron, phosphorus, and energy, but at or above the RDA for the B vitamins and protein. The pattern of vitamin and mineral intake was fairly similar to that observed for women in the remainder of the nation (18). The percentages of fat, carbohydrate, and protein in the diet, on the other hand, were closer to those recommended in the Dietary Goals than was the 1985 diet of women in the nation as a whole (18).

The relative adequacy of the women's diet, despite their very low income levels, was associated with substantial use of foods provided by the Food Distribution Program. Except for vitamins A and C, commodity foods were the source of approximately 50% of nutrient intakes. Thus, this program appeared to make an important nutritional contribution to the contemporary Navajo diet.

Nonetheless, the Navajo diet, as assessed, was well below the RDA in vitamins A and C, and commodity foods contributed least to the intakes of these nutrients. In addition, although commodity foods as a whole ap-

peared to contribute relatively more nutrients than fat, the high-fat foods provided by the program were nearly all saturated. The types of foods reported in the dietary recalls also suggested that the saturated to polyunsaturated fat intake in the diet was higher than recommended. Finally, FDP foods did not add much fiber to the already low-fiber Navajo diet. Thus it is recommended that the program provide more sources of vitamins A and C and fiber and less saturated fat.

Some potential ways to modify the existing program to better meet nutrient needs are (a) to provide vouchers for the purchase of specific fresh fruits and vegetables, which are increasingly available in reservation stores and would provide sources of fiber as well as vitamins A and C; (b) to encourage community growing of such fruits and vegetables, especially those that are traditional, such as apricots and cantaloupe; (c) to increase the quantity and variety of vitamin A- and C-fortified foods provided by the program; and (d) to replace the shortening provided with vegetable oil.¹ All of those modifications should be accompanied by appropriate nutrition education. With changes such as those, the Food Distribution Program could have an even greater positive impact on the diet and nutritional status of Navajo women.

¹The first author had the opportunity to sample some fry bread that a progressive Navajo woman had cooked in vegetable oil rather than in lard; it was quite good.

References

- (1) Jackson, M.Y.: Nutrition in American Indian health: Past, present, and future. *J Am Diet Assoc* 86:1561, 1986.
- (2) Navajo Area Vital Events (Mortality-Natality) Report, Calendar Year 1979. Window Rock, AZ: Navajo Area Indian Health Service, 1982.
- (3) Navajo Area Morbidity Report, FY 1982. Window Rock, AZ: Navajo Area Indian Health Service, 1983.
- (4) Butte, N.F., Calloway, D.H., and Van Duzen, J.L.: Nutritional assessment of pregnant and lactating Navajo women. *Am J Clin Nutr* 34:2216, 1981.
- (5) Wolfe, W.S.: Ethnographic and Nutritional Investigation of Navajo Indian Foodways, Dietary Patterns, and Nutritional Status. M.S. Thesis. Cornell University, 1984.
- (6) McDonald, B.: Nutrition of the Navajo. 2nd ed., 1965. Unpublished report. Window Rock, AZ: Window Rock Field Office, Division of Indian Health, Public Health Service, 1965.
- (7) Sanjur, D.: Social and Cultural Perspectives in Nutrition. Englewood Cliffs, NJ: Prentice-Hall, 1982.
- (8) Lechtig, A., Yarbrough, C., Martorell, R., Delgado, H., and Klein, R.E.: The one-day dietary survey: A review of its usefulness to estimate protein and calorie intake. *Arch Latinoam Nutr* 26:243, 1976.
- (9) Wolfe, W.S., Weber, C.W., and Arviso, K.D.: Use and nutrient composition of traditional Navajo foods. *Ecol Food Nutr* 17:323, 1985.
- (10) Food and Nutrition Board: Recommended Dietary Allowances. 9th rev. ed., 1980. Washington DC: National Academy of Sciences, 1980.
- (11) Snedecor, G.W., and Cochran, W.G.: Statistical Methods. 7th ed. Ames: Iowa State University Press, 1980.
- (12) New weight standards for men and women. *Stat Bull Metrop Life Insur Co* 40:1, 1959.
- (13) Darby, W.J., Salsbury, C.G., McGanity, W.J., Johnson, H.F., Bridgforth, E.B., and Sandstead, H.R.: A study of the dietary background and nutriture of the Navajo Indian. *J Nutr* 60:Suppl. 2, 1956.
- (14) Preliminary data from the 1980-81 Continuing Consumer Expenditure Survey. *Family Econ Rev* 4:27, 1983.
- (15) Alford, B.B., and Nance, E.B.: Customary foods in the Navajo diet. *J Am Diet Assoc* 69:538, 1976.
- (16) Bass, M.A., and Wakefield, L.M.: Nutrient intake and food patterns of Indians on Standing Rock Reservation. *J Am Diet Assoc* 64:36, 1974.
- (17) Select Committee on Nutrition and Human Needs, U.S. Senate: Dietary Goals for the United States. 2nd ed. Washington, DC.: Government Printing Office, 1976.
- (18) Nationwide Food Consumption Survey: Continuing Survey of Food Intakes by Individuals. Report No. 85-1. Human Nutrition Information Service, USDA, 1985.
- (19) Friend, B., and Marston, R.: Nutritional review. In *National Food Situation, NFS-150*, Economic Research Service, USDA, Washington, DC, Nov. 1974.
- (20) Anderson, J.W.: Dietary fiber and diabetes. In Spiller, G.A., and Kay, R.P., eds.: *Medical Aspects of Dietary Fiber*. New York: Plenum Press, 1980.