Prevalence of Self-Reported Nutrition-Related Health Problems in the Lower Mississippi Delta

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ABSTRACT

Objectives. The purpose of this study was to assess demographic and geographic differences in prevalence of self-reported nutrition-related health problems in Arkansas, Louisiana, and Mississippi.

Methods. The authors analyzed 1991 and 1993 Behavioral Risk Factor Surveillance System data for adults 18 years or older.

Results. Less educated African American women and women of other minority groups who were aged 35 to 64 years reported the highest prevalence of health problems. Geographic differences involved prevalence of hypertension, health status, and insurance status.

Conclusions. Specific demographic subgroups and geographic areas with a high risk of health problems are in particular need of targeted interventions. *(Am J Public* Health. 1999;89: 1418–1421)

The 3 states that compose the Lower Mississippi Delta region—Arkansas, Louisiana, and Mississippi—rank among the nation's 5 poorest states.[1] The region is predominantly rural, and minorities (primarily African American) make up 37%, 33%, and 17% of the populations of Mississippi, Louisiana, and Arkansas, respectively.[2] While 20% to 26% of the area's residents have incomes below the federal poverty level, 56% of African American households have incomes below the poverty level.[3]

Others have documented the relationship between unhealthy dietary behaviors and chronic conditions.[4,5] Although it is well established that chronic health conditions are more prevalent in the Lower Mississippi Delta region than in the rest of the country, few studies have examined differences in prevalence among demographic and geographic subsets of the population.[1,6] The purpose of this study was to compare geographic regions and to identify subpopulations at higher risk for chronic nutrition-related disorders as an essential prelude to developing appropriate intervention strategies.

Methods

The Behavioral Risk Factor Surveillance System (BRFSS) is an annual random-digit-dialed telephone survey of noninstitutionalized civilian adults 18 years or older that is conducted by state health departments in collaboration with the Centers for Disease Control and Prevention (CDC).[7,8] The BRFSS uses a multistage cluster sampling technique based on the Waksberg method.[8,9] The present analysis used Arkansas, Louisiana, and Mississippi data from 4586 respondents in 1991 and 5001 respondents in 1993 (Arkansas did not participate in 1992).

In 1994, Congress established the Lower Mississippi Delta Nutrition Intervention Research Initiative ("Delta NIRI"), a consortium of 6 academic institutions in the region (Alcorn State University [Lorman, Miss], Arkansas Children's Hospital Research Institute [Little Rock], Pennington Biomedical Research Center [Baton Rouge, La], Southern University and A&M College [Baton Rouge], University of Arkansas at Pine Bluff, University of Southern Mississippi [Hattiesburg]), a coordinating center (Westat, Inc [Rockville, Md]), and the Agricultural Research Service of the US Department of Agriculture, to conduct nutrition intervention research in the Lower Mississippi Delta region.[1] Of the 222 counties–parishes in Arkansas, Louisiana, and Mississippi, 36 were selected, on the basis of poverty and geographic criteria, as Delta Initiative counties for intervention research.[10] In the 1991 and 1993 versions of the BRFSS, there were 827 respondents from Delta NIRI counties–parishes.

Self-reported weight and height were used to derive body mass indexes (BMIs). Obesity was defined as a BMI of 27.3 kg/m^2 or higher for women and a BMI of 27.8 kg/m^2 or higher for men.[8,11] Respondents were asked whether (1) they had ever been told by a health professional that they had diabetes, high blood pressure, or high cholesterol; (2) they had ever had their cholesterol tested; (3) they had had their blood pressure taken in the previous year; and (4) they had health insurance. In 1993, respondents rated their health on a 5-point scale (excellent, very good, good, fair, or poor).

Prevalence rates and 95% confidence intervals were calculated, and t tests were used to compare proportions; analyses used Stata 5.0[12,13] and were based on large sample methods for weighted survey data. BRFSS data were weighted by the CDC to reflect the

TABLE 1—Demographic Characteristics, Prevalence of Chronic Conditions, and Health Behaviors and Perceptions in Delta NIRI and non–Delta NIRI Counties–Parishes and the Rest of the United States: Behavioral Risk Factor Surveillance System, 1991 and 1993

	Delta NIRI Counties, % (95% CI)	Non–Delta NIRI Counties, % (95% CI)	P[a]	Other States,[b] % (95% CI)
Demographic characteristics				
Female	53.9 (49.8, 58.1)	53.1 (52.0, 54.3)	.706	52.1 (51.7, 52.4)
African American–other minority[c]	44.5 (39.9, 49.0)	25.0 (23.8, 26.2)	<.001	14.4 (14.1, 14.7)
Less than high school education	34.8 (31.2, 38.5)	21.1 (20.1, 22.0)	<.001	15.0 (14.7, 15.3)
Aged 65+ years	19.9 (17.0, 22.8)	17.2 (16.3, 18.1)	.087	16.9 (16.7, 17.2)
Chronic conditions				
Obesity	31.3 (27.7, 34.9)	28.5 (27.4, 29.5)	.138	25.1 (24.8, 25.4)
Diabetes	6.9 (5.1, 8.8)	5.7 (5.2, 6.2)	.217	4.8 (4.7, 5.0)
High blood pressure	28.9 (25.4, 32.4)	24.3 (23.3, 25.3)	.014	21.3 (21.0, 21.6)
High cholesterol	28.0 (23.7, 32.2)	27.2 (25.9, 28.5)	.724	27.4 (27.0, 27.8)
Behavioral characteristics				
Tested for cholesterol	57.9 (53.8, 62.0)	63.7 (62.6, 64.9)	.007	68.9 (68.5, 69.2)
Recent blood pressure test	88.6 (85.8, 91.4)	89.3 (88.5, 90.0)	.651	88.4 (88.1, 88.6)
General health poor to fair	25.3 (20.2, 30.4)	18.6 (17.4, 19.9)	.013	13.2 (12.9, 13.5)
Covered by health insurance	76.0 (72.3, 79.7)	80.9 (79.9, 81.9)	.012	85.9 (85.6, 86.2)

Note. NIRI = Nutrition Intervention Research Initiative; CI = confidence interval.
[a]Delta NIRI counties vs non–Delta NIRI counties.
[b]In 1991, there were 88 021 respondents in 48 states and the District of Columbia; in 1993, there were 102 464 respondents in 49 states and the District of Columbia.
[c]All racial/ethnic groups, excluding non-Hispanic Whites.

unequal probabilities of selection and the demographic distribution of the population.[7] In the case of prevalence estimates for Delta NIRI and non–Delta NIRI counties–parishes within the 3 states, the data were reweighted with 1990 census data to better reflect the specific demographic distributions.

Results

In comparison with non–Delta NIRI counties–parishes in Arkansas, Louisiana, and Mississippi, Delta NIRI counties–parishes had a significantly higher proportion of residents who were African American or were members of other racial/ethnic minority groups and residents who had less than a high school education (Table 1). In Delta NIRI counties–parishes, respondents were significantly more likely to report having hypertension and to rate their health as poor to fair, and they were less likely to have health insurance and to have had cholesterol screening.

For the 3 states, the proportion of respondents reporting that a health care professional had told them that they had diabetes increased with age for men and women regardless of educational level and race (Table 2). However, among African American women and women who were members of other racial/ethnic minority groups, the prevalence peaked earlier, at 35 to 64 years, for those with less education. In these groups, 1 in 4 women reported that they had

diabetes. Among all racial/ethnic and educational groups, men and women 65 years or older reported the highest prevalence of hypertension.

The prevalence of reported obesity peaked at midlife and declined among older persons in most demographic groups. In the 35- to 64-year age group, 70% of African American women and women of other racial/ethnic minority groups who had not graduated from high school were overweight. Similarly, the highest prevalence of elevated cholesterol was among African American women and women of other racial/ethnic minority groups aged 35 to 64 years who had not graduated from high school.

Discussion

Arkansas, Louisiana, and Mississippi respondents in Delta NIRI counties reported higher prevalences of risk factors and chronic health conditions than respondents in non–Delta NIRI counties–parishes. For the 3 states, we identified demographic subgroups with the highest prevalences of chronic health conditions for potential nutrition intervention.

Hypertension, an important risk factor for cardiovascular disease,[14] was significantly more prevalent in Delta NIRI counties–parishes than in non–Delta NIRI counties–parishes. Our findings are consistent with other studies that have reported an associa-

tion between lack of health insurance and poor general health.[15–18] Furthermore, Shea et al. similarly demonstrated significant associations between educational attainment and obesity, knowledge about blood pressure and cholesterol, and elevated cholesterol.[19]

Several limitations should be considered. As a result of the small subgroup sample sizes, important differences may not have been identified. Those residing in households without telephones, who tend to be of lower socioeconomic status, were not included.[8,20] The prevalence of health problems has been shown to be higher in such populations, so prevalence estimates reported here may be low. In the Lower Mississippi Delta, where lack of health insurance is common, respondents may not know whether they have a health disorder. Moreover, the validity of self-reported cardiovascular risk factor data has been shown to be problematic in that prevalence is underreported.[21] Studies have revealed that respondents tend to underreport their weight and overestimate their height, which would lower prevalence estimates of obesity.[22] Furthermore, because body fat tends to be higher in older persons, measurements of weight underestimate the prevalence of "over-fatness."[23,24] Declines in the prevalence of obesity among older persons may be due to early mortality among obese individuals.[25]

These results indicate the need to further assess the factors that contribute to the high prevalence of reported risk factors and dis-

TABLE 2—Prevalence of Diabetes, Obesity, High Blood Pressure, and High Cholesterol, by Sex, Race, Age, and Educational Level: Lower Mississippi Delta States, Behavioral Risk Factor Surveillance System, 1991 and 1993

	White		African American–Other Minority	
	Less Than High School, % (95% CI)	High School or More, % (95% CI)	Less Than High School, % (95% CI)	High School or More, % (95% CI)
Diabetes				
Women, age, y				
<35	2.7 (0.0, 5.4)	2.5 (1.6, 3.5)	6.0 (0.0, 13.2)	1.9 (0.4, 3.3)
35–64	6.8 (4.0, 9.5)	4.4 (3.4, 5.4)	25.5 (18.5, 32.6)	9.5 (6.3, 12.6)
65+	16.5 (12.6, 20.5)	5.8 (3.8, 7.8)	25.3 (18.3, 32.4)	7.7 (1.4, 14.1)
Men, age, y				
<35	3.4 (0.0, 6.7)	1.4 (0.0, 2.6)	1.2 (0.0, 3.0)	0.3 (0.0, 0.8)
35–64	7.2 (3.5, 10.9)	5.3 (3.9, 6.6)	5.8 (0.6, 11.0)	5.2 (1.2, 9.2)
65+	13.6 (8.2, 19.0)	11.2 (7.5, 14.9)	16.6 (7.3, 25.8)	13.5 (0.0, 27.3)
High blood pressure				
Women, age, y				
<35	16.1 (9.3, 22.9)	8.1 (6.3, 10.0)	21.1 (10.8, 31.4)	15.6 (11.7, 19.6)
35–64	37.5 (31.2, 43.8)	21.4 (19.3, 23.6)	64.0 (56.0, 72.0)	36.5 (31.2, 41.9)
65+	50.1 (44.7, 55.6)	40.7 (36.5, 44.9)	65.8 (58.2, 73.3)	53.0 (38.4, 67.6)
Men, age, y				
<35	11.8 (6.0, 17.7)	8.3 (6.3, 10.3)	8.9 (1.8, 16.0)	13.9 (8.9, 18.9)
35–64	27.8 (21.5, 34.0)	24.2 (21.7, 26.8)	40.6 (29.1, 52.2)	25.1 (18.6, 31.6)
65+	41.8 (33.8, 49.9)	33.0 (27.4, 38.6)	51.6 (39.6, 63.6)	44.5 (20.9, 68.0)
Obesity				
Women, age, y				
<35	25.6 (17.1, 34.1)	15.3 (12.9, 17.7)	53.0 (40.0, 66.1)	28.5 (23.6, 33.4)
35–64	39.2 (33.2, 45.3)	25.6 (23.2, 28.1)	69.9 (62.1, 77.6)	49.0 (43.2, 54.9)
65+	32.6 (27.5, 37.7)	22.4 (18.6, 26.1)	53.6 (46.0, 61.2)	50.1 (35.3, 65.0)
Men, age, y				
<35	21.6 (13.6, 29.5)	21.6 (18.6, 24.7)	11.7 (3.8, 19.6)	26.1 (18.8, 33.4)
35–64	36.3 (29.3, 43.4)	34.0 (31.1, 36.9)	36.3 (24.6, 47.9)	34.7 (27.6, 41.8)
65+	19.0 (12.7, 25.3)	23.9 (19.0, 28.8)	21.0 (11.2, 30.8)	19.7 (0.0, 40.4)
High cholesterol				
Women, age, y				
<35	16.2 (4.5, 27.9)	14.7 (11.4, 18.1)	19.3 (3.4, 35.2)	13.6 (8.3, 18.9)
35–64	41.8 (33.7, 50.0)	29.2 (26.4, 32.0)	44.9 (34.3, 55.6)	27.2 (21.2, 33.2)
65+	40.3 (34.2, 46.4)	40.8 (36.2, 45.3)	35.4 (26.6, 44.2)	20.3 (9.0, 31.6)
Men, age, y				
<35	20.2 (6.8, 33.7)	13.0 (9.2, 16.7)	11.0 (0.0, 25.4)	12.7 (5.3, 20.1)
35–64	26.3 (17.9, 34.6)	31.7 (28.4, 35.0)	30.8 (14.7, 46.8)	25.3 (17.1, 33.6)
65+	31.8 (23.2, 40.5)	27.8 (22.1, 33.6)	17.2 (6.3, 28.1)	25.0 (0.1, 49.9)

Note. The sample sizes for diabetes, high blood pressure, and obesity ranged from 223 for Black men with less than a high school education to 3480 for White women with greater than a high school education. The sample sizes for high cholesterol were smaller because not all respondents had a cholesterol reading; they ranged from 108 for Black men with less than a high school education to 2367 for White women with greater than a high school education. White includes only non-Hispanic Whites. African American–Other Minority includes all racial/ethnic groups other than non-Hispanic Whites. CI = confidence interval.

ease among population subgroups in the Lower Mississippi Delta, where poverty, low education, and lack of health insurance are common. Interventions specifically designed to improve the health of high-risk individuals in this region are needed, especially for African American women at low educational levels. □

Contributors

J. Smith conceived of and designed the study, interpreted data findings, and wrote the initial version of the paper. S. Lensing analyzed data, and J. A. Horton interpreted data findings. S. Lensing, J. A. Horton, J. Lovejoy, S. Zaghloul, I. Forrester, B. B. McGee, and M. L. Bogle all contributed to the writing of the paper.

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The Abuela Project: Safe Cheese Workshops to Reduce the Incidence of *Salmonella* Typhimurium From Consumption of Raw-Milk Fresh Cheese

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ABSTRACT

Objectives. A multiagency intervention was implemented in Yakima County, Wash, to reduce the incidence of *Salmonella* serotype Typhimurium infections resulting from eating *queso fresco* (fresh cheese) made from raw milk, a traditional food in the Hispanic diet.

Methods. A pasteurized-milk *queso fresco* recipe with taste and texture acceptable to the Hispanic community was developed. Trained Hispanic volunteers conducted safe cheese workshops, which were attended by more than 225 persons.

Results. Workshop participants' acceptance of the new recipe was excellent and positive behavior changes were maintained over 6 months.

Conclusions. Educational interventions in Hispanic communities can reduce the incidence of *Salmonella* Typhimurium associated with eating *queso fresco.* (*Am J Public Health.* 1999;89:1421–1424)

Queso fresco is a popular form of fresh cheese in Latin America that has traditionally been made with raw milk.[1] In comparison with hard, aged cheeses such as cheddar, fresh cheeses have a high moisture content and a relatively high pH, which provides an excellent environment for bacterial growth. As a result, fresh cheeses pose the highest risk of any type of raw-milk cheese.[2] Five of 11 cheese-associated outbreaks reported to the Centers for Disease Control between 1973 and 1992 were associated with soft cheeses such as *queso fresco.*[3]

In the United States, a strain of *Salmonella* serotype Typhimurium (Definitive Type [DT] 104) that is resistant to 5 major antibiotics has rapidly emerged as a pathogen of food animals and humans.[4,5] In 1997, raw-milk *queso fresco* was implicated as the source of *Salmonella* Typhimurium DT104 infections in California.[6]

From 1992 to 1996, the annual incidence of *Salmonella* Typhimurium infections in Yakima County, Washington, increased from 5.4 to 29.7 cases per 100 000 population, one of the highest rates in the United States.[7] Between January and May 1997, 89 cases of *Salmonella* Typhimurium were reported in Yakima County, of which 54 were culture-confirmed as DT104.[7] The median age of infected persons was 4.0 years (range 0–53 years). Ninety percent of the patients had Spanish surnames. A case–control investigation conducted by the Centers for Disease Control and Prevention indicated that the most probable source of the outbreak was raw-milk *queso fresco.*[7]

The investigation found that street vendors were the most frequent source of *queso*

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