Research and Professional Briefs

Eating Behaviors and Health History of Rural Midlife to Older Women in the Midwestern United States

LINDA S. BOECKNER, PhD, RD; CAROL H. PULLEN, EdD, RN; SUSAN NOBLE WALKER, EdD, RN, FAAN; MAUREEN K. OBERDORFER, MPA; PATRICIA A. HAGEMAN, PhD, PT

ABSTRACT

This study was conducted to examine daily energy, food group, and nutrient intakes of late midlife to older women living in the rural Midwestern United States compared with recommended intakes for the US population, and to describe their physical measures and health history. Random-digit dialing was used to recruit 225 community-dwelling women aged 50 to 69 years from a rural Midwestern area of the United States. Participants completed online food intake and health history surveys. Nearly half of the women had energy intakes in excess of their Estimated Energy Requirement. Mean daily servings of fruits, grains, and dairy products were below target levels identified in the 2000 *Dietary Guidelines for Americans*. Mean calcium and dietary fiber intakes were below recommended levels, while percent calories from fat (39.0%±6.8%) were well above recommendations. Eighty percent were overweight or obese and 76% were prehypertensive or hypertensive, yet only 33.5% indicated their health care provider had discussed dietary factors with them in the previous year. Late midlife and older rural Midwestern women, aged 50 to 69 years, need more guidance than they currently receive to learn how to make changes to meet dietary recommendations, particularly with a focus on establishing a more healthful dietary pattern that will be suitable for their older years.

J Am Diet Assoc. 2007;107:306-310.

L. S. Boeckner is a professor and extension nutrition specialist, University of Nebraska-Lincoln, Scottsbluff. C. H. Pullen is a professor, S. Noble Walker is professor and Dorothy Hodges Olson Chair in Nursing, and M. K. Oberdorfer is a project coordinator, University of Nebraska Medical Center, College of Nursing, Omaha. P. A. Hageman is director and professor, Physical Therapy Education, University of Nebraska Medical Center, Omaha.

Address correspondence to: Linda S. Boeckner, PhD, RD, University of Nebraska-Lincoln, 4502 Ave I, Scottsbluff, NE 69361. E-mail: Lboeckner1@unl.edu

0002-8223/07/10702-0005$32.00/0

doi: 10.1016/j.jada.2006.11.012

As women age, their risk for chronic illness increases, with the likelihood that they will endure more years of disability and functional impairment than men (1,2). Rural older women, in particular, experience poorer health status and have higher obesity prevalence than urban women (3-5). Poor diet is among the modifiable factors that affect chronic disease risk and is a suitable target for behavior change in midlife to older women.

The rural American population is a diverse group that represents a variety of ethnic, socioeconomic, and cultural entities across the United States (6). Thorndyke (7) advocated for a more vigorous research agenda to identify health risk factors, prevention strategies, and health education approaches for rural women that is culturally and regionally appropriate and will reflect more refined rural categories.

This study was a first step in developing optimal behavioral and educational approaches that would be appropriate for rural Midwestern women ages 50 to 69 years. Specific aims were to (a) compare daily energy and selected nutrient intakes with the Dietary Reference Intakes (8-11), (b) compare daily food group consumption with current recommendations (12,13), and (c) describe physical measures and general health history and implications for nutrition education intervention.

METHODS

University survey center personnel recruited 225 women from two rural sites with similar demographic characteristics using random-digit telephone-dialing techniques. At the time of recruitment, the household telephone ownership rate for this rural area was 97.6%. All women were between the ages of 50 and 69 years, English-speaking, able to communicate over the telephone, able to travel to the research site, and able to use a computer with assistance to complete an Internet survey. Subject enrollment extended over a 6-month period, with initial enrollment beginning in the fall of the year. All women gave their informed consent to participate according to a process approved by the University of Nebraska Medical Center Institutional Review Board.

Women completed all questionnaires on a computer at the rural sites and data were transmitted to the University Medical Center via the Internet. Research nurses provided an orientation to the process of online assessment and were available during the assessment to answer any questions.

Table 1. Daily energy, nutrient, and food group intakes of 225 rural Midwestern midlife and older women compared with Dietary Reference Intakes and *Dietary Guidelines for Americans/Healthy People 2010* targets

Energy and nutrients	Recommended amount[a]	Range	Mean±standard deviation	Meets Recommendation	
				n	%
Energy (kcal)	1,407-2,498[b]	643-6,089	2,020±820	28[c]	12.4
Protein (% kcal)	10-35	8.74-23.71	16.0±2.9	222	98.7
Total fat (% kcal)	20-35	17.2-61.2	39.0±6.8	54	24
Saturated fat (% kcal)	—[d]	0.5-20.4	11.4±.6		
Carbohydrate (% kcal)	45-65	18.3-71.0	46.0±7.7	124	55.1
Calcium (mg)	1,200	185.1-2,787.5	815.7±402.0	38	16.9
Iron (mg)	8	3.3-37.3	14.1±5.7	200	88.9
Vitamin A (ug)	700	340-7,364	1,562±977	198	88
Vitamin C (mg)	75	25.3-503.9	127.5±72.1	171	76
Total fiber (g)	21	5.1-51.8	19.2±8.7	79	35.1

Food groups	Daily target servings	Range of servings eaten	Mean±standard deviation	Adherence to Targets					
				Below		Met		Above	
				n	%	n	%	n	%
Grains	6-9[e]	0.3-21.4	4.3±2.6	190	84.4	22	9.8	13	5.8
Whole grains	3+[f]	0.0-8.8	1.2±1.3	217	96.4	8	3.6		
Vegetables	3-4[e]	0.7-16.8	3.9±2.3	93	41.3	77	34.2	55	24.4
Fruits	2-3[e]	0.1-4.4	1.7±1.0	137	60.9	61	27.1	27	12
Dairy	2-3[e]	0.0-6.5	1.4±1.1	170	75.6	35	15.6	20	8.9
Meat	2-3[e]	0.2-8.0	2.4±1.2	103	45.8	66	29.3	56	24.9

[a]Recommended amounts per day are Dietary Reference Intakes for women, ages 51 to 70 years, which include Adequate Intakes for calcium and fiber (8,11); Recommended Dietary Allowances for iron, vitamin A, and vitamin C (9,10); and Acceptable Macronutrient Distribution Ranges for total fat, carbohydrate, and protein (11).
[b]Recommended amount for energy is a range of the Estimated Energy Requirement (EER) that is suitable for all height, weight, and ages of the 225 women (11). The formula for women was calculated as follows: EER=354−6.91×age [years]+PA×(9.36×weight [kg]+726×height [m]) where PA is the physical activity coefficient. PA of 1.0 for sedentary activity was used in this formula.
[c]Represents those who fell between 0.95 and 1.05 EER.
[d]Acceptable Macronutrient Distribution Range has not been established for saturated fat intake (11).
[e]Range of target serving recommendations reflects those for sedentary, older women to active, older women (13).
[f]Target servings for whole grains are from *Healthy People 2010* objectives, which suggest minimum daily amounts (12).

Dietary intake was measured by the 1998 Block Health Habit and History Questionnaire, which has been validated previously (14-20). Each food entry contained nine frequency ranges and a choice of serving sizes. Food entries included major foods for African-American, Hispanic, and white populations. Fat-modified food items were included to improve nutrient estimates of fat intake. Women reviewed three-dimensional and two-dimensional models of food portion sizes before completing the questionnaire.

Research nurses took a single measurement for height and weight using a portable stadiometer and a calibrated clinical scale (SECA Model 700W, Pro-Med Products, Inc, Atlanta, GA) following standardized procedures (21). Height and weight were used to calculate body mass index. Resting blood pressure was measured following 5 minutes of quiet sitting using a desk sphygmomanometer (Model 03-225, Pro-Med Products, Inc) and was the average of at least two readings with at least 30 seconds between consecutive readings (22). Percent body fat was measured according to standardized procedures (23) (Biodynamics Model 310e Body Composition Analyzer; Biodynamics Corporation, Seattle, WA).

Statistical analyses were performed using SPSS statistical package (SPSS v11.5.0 for Windows, 2002, SPSS Inc, Chicago, IL). Descriptive statistics were calculated for all variables and presented as mean±standard deviation for continuous variables and as percentages for categorical variables. Mean dietary intakes for energy, protein, carbohydrate, fat, vitamin A, vitamin C, iron, calcium, and fiber were calculated and compared against appropriate Dietary Reference Intakes (8-11). Macronutrients (fat, protein, and carbohydrate) were analyzed as a percentage of calories consumed. Mean food group intakes were determined and women were grouped according to whether they had met daily food group targets, based on the 5th edition of the *Dietary Guidelines for Americans* or *Healthy People 2010* targets (12,13).

RESULTS AND DISCUSSION

The mean (±standard deviation) age of the women enrolled in the Wellness for Women project was 58.0±5.6 years. The women were predominantly middle-income and married. A majority had at least some college education and two thirds were employed either full or part-