

ARIC Manuscript Proposal # 874 Revised (2)

PC Reviewed: 11/13/02
SC Reviewed: 11/15/02

Status: A
Status: A

Priority: 2
Priority: 2

1.a. Full Title: Association between diet quality and functional and self-rated health in a bi-ethnic cohort: the Atherosclerosis Risk in Communities Study

b. Abbreviated Title (Length 26 characters): diet and functional health

2. Writing Group (list individual with lead responsibility first): Denise Houston, June Stevens, Jianwen Cai, Larry Branch, Patricia Dubbert

Lead: Denise Houston

Address: Dept. of Nutrition, School of Public Health

CB# 7461, McGavran-Greenberg Hall

The University of North Carolina at Chapel Hill

Chapel Hill, NC 27599-7461

Phone: 919-966-0117

Fax: 919-966-8392

E-mail: houstond@email.unc.edu

Writing group members:

Denise Houston, MS, RD, is a doctoral student from the Department of Nutrition in the School of Public Health at the University of North Carolina at Chapel Hill.

June Stevens, PhD, is a Professor in the Departments of Nutrition and Epidemiology in the School of Public Health at the University of North Carolina at Chapel Hill and an experienced ARIC investigator who specializes in obesity epidemiology.

Jianwen Cai, PhD, is an Associate Professor in the Department of Biostatistics in the School of Public Health at the University of North Carolina at Chapel Hill and an experienced ARIC Investigator.

Larry Branch, PhD, is a Professor of Gerontology at the Center for the Study of Aging and Human Development at Duke University and has extensive experience analyzing self-reported function and self-rated health.

Patricia Dubbert, PhD, is a Professor of Psychiatry, Preventive Medicine, and Medicine at the University of Mississippi School of Medicine and Associate Chief of Mental Health at the VA Medical Center in Jackson, MS, and an ARIC investigator at the Jackson site.

3. Timeline: Dataset preparation and analysis will start immediately upon approval.

4. Rationale:

The African American elderly population is expected to more than triple by the year 2050 while the white elderly population will double[1]. Although there have been recent declines in the disability rate among U.S. elderly, it has been estimated that the number of disabled elderly will triple between 1985 and 2050[2]. With the aging of the population, there is increased emphasis on maintaining functional health and independence of the elderly. Functional

dependence has been shown to predict death, nursing home admission, hospitalizations, and physician visits in persons aged 80 years and older[3] and mortality in persons aged 65 years and older[4, 5]. In addition, poor self-rated health has been associated with functional limitations and increased risk of mortality[6, 7]. In the 1994 National Health Interview Survey among those 70 years and older, African Americans reported higher levels of impaired functional health than whites [8]. Elderly African Americans reported worse self-rated health than whites at every age.

Several studies in predominantly white populations have examined the associations between diet and functional and self-rated health in the elderly using various nutritional risk and healthy eating indices[9-16]. Three of these studies were prospective[14, 15, 17]; however, one had a follow-up period of only one year[14]. To our knowledge, the only study to examine this association in African Americans (n=22) was cross-sectional[10]. The investigators found a positive association between nutritional risk and impaired ADLs and an inverse association between nutritional risk and self-rated health[10]. The association between alcohol consumption and functional and self-rated health has been examined with inconsistent results in predominantly white populations only[12, 16-25]. In addition, several European studies have examined the associations between specific dietary nutrients and functional health[20, 26-28] but only one of these was a prospective study[27].

The U.S. elderly population is projected to increase substantially over the next 50 years. However, little is known about nutrition-related predictors of impaired functional and self-rated health, especially in African Americans. The Atherosclerosis Risk in Communities Study offers a unique opportunity to examine the associations between diet quality and alcohol consumption and functional and self-rated health in a bi-ethnic cohort of men and women as they progress from middle-aged to elderly. We will investigate the associations of diet controlling for chronic disease (CHD, cancer, stroke, diabetes) by using exclusions.

5. Main Hypothesis/Study Questions:

The following aims will be examined prospectively in analyses stratified by ethnicity and gender:

1. Determine the associations between baseline diet quality and number of servings from food groups and functional and self-rated health assessed at 9-year follow-up.
2. Examine the association between specific nutrients at baseline and functional and self-rated health assessed at 9-year follow-up.
3. Determine the associations between baseline alcohol consumption with functional and self-rated health assessed at 9-year follow-up.

6. Data (variables, time window, source, inclusions/exclusions):

Food groups will be created using frequencies of foods consumed from the 66-item, semi-quantitative food frequency questionnaire at baseline for the following categories: grains, vegetables, fruit, milk, and meat. A healthy eating index, similar to the USDA Healthy Eating Index, will be created. As diet may change as a result of disease diagnosis, participants who were diagnosed with coronary heart disease, stroke, cancer, or diabetes at baseline will be excluded.

We are aware of the complex issue involving the temporal sequence between exposures and outcomes in these analyses. For example, poor diet may lead to declines in functional health, and declines in functional health may lead to poor diet. Similarly, intake of alcohol may lead to declines in functional health, and declines in functional health may lead to reduced alcohol intake. This problem of "reverse causality" may only be partially solved by a prospective analysis. We hypothesize that with 9 years of separation between the observation of diet and alcohol intake and functional health, it is reasonable to assert that the problem of reverse causality has been reduced. Nevertheless, it will be recognized in our discussion of results.

Responses to the Physical Ability Questionnaire administered at visit 4 will be used to determine functional health. The questions will be divided into two scales. The mobility scale will include the following questions: walking for ¼ of a mile, walking up 10 steps without resting, stooping/crouching/kneeling, lifting or carrying something as heavy as 10 pounds. The functional ability scale will include the following questions: doing chores around the house, preparing your own meals, walking from one room to another, standing up from an armless straight chair, getting in or out of bed, eating or drinking from a glass, dressing yourself. Responses to these questions by level of difficulty were obtained: no difficulty, some difficulty, much difficulty, or unable to do. Additionally, two summary questions indicating a need for help from other persons with personal care needs or routine needs due to any impairment or health problem and the use of assistive devices to get around will be analyzed. Unfortunately data on functional impairment were not collected in earlier ARIC surveys. As a proxy for these measures we will use variables that are available. One asked participants if they used a wheelchair, crutches or walker or walked with a cane at visit 1. The second (asked immediately prior to visit 1) determined if the participant would need assistance climbing steps or getting around the clinic during their first ARIC examination visit. Participants who responded positively to either of these items will be excluded from analyses of functional health.

Self-rated health will be assessed from the annual follow-up questionnaire. Participants who rated their health as poor at baseline will be excluded from analyses of self-rated health.

We will use the following data from ARIC:

Identification information:

- Participant identification number (visit 1 - 4)
- Visit date (visit 1 & 4)
- ARIC field center (visit 1)

Demographics:

- Ethnicity (visit 1)
- Gender (visit 1)
- Date of birth (visit 1)
- Age (visit 1 & 4)
- Marital status (visit 4)
- Number of household members (visit 4)

Anthropometrics (visit 1 - 4):

- Weight
- Height
- BMI

Diet (visits 1 & 3):

- Frequencies of consumption of foods from 66-item FFQ
- Total energy (kcal)
- Protein (g, % kcal)
- Carbohydrates (g, % kcal)
- Total fat (g, % kcal)
- Saturated fat (g, % kcal)
- Monounsaturated fat (g)
- Polyunsaturated fat (g)
- Cholesterol (mg)
- Dietary fiber (g)
- Sucrose (g)
- Vitamins
- Minerals

Alcohol consumption (visits 1 & 4):

- Alcohol (g)

Functional health (visit 4):

- Physical Ability Questionnaire

Annual Follow-up Questionnaire:

- Functional Status
- Self-rated health
- Date of annual follow-up

Others:

- Smoking (visit 1 & 4): smoking status and # of cigarettes
- Physical activity (visit 1 & 3)
- Education (visit 1)
- Prevalent CHD (visit 1)
- Incident CHD (visit 2-4, annual follow-up)
- Prevalent cancer (visit 1)
- Incident cancer (visit 2-4, annual follow-up)
- Prevalent stroke (visit 1)
- Incident stroke (visit 2-4, annual follow-up)
- Hypertension (visit 1-4)
- Diabetes (visit 1-4)

Exclusions:

- Minorities other than African American
- African Americans residing in Minnesota and Maryland
- Participants with coronary heart disease, stroke, cancer, or diabetes at baseline
- For analyses with functional health as the outcome, participants with impaired functional health at baseline assessed by proxy variables will be excluded
- For analyses with self-rated health as the outcome, participants with poor self-rated health at baseline will be excluded

7.a. Will the data be used for non-CVD analysis in this manuscript? Yes No

b. If Yes, is the author aware that the file ICTDER02 must be used to exclude persons with a value RES_OTH = "CVD Research" for non-DNA analysis, and for DNA analysis RES_DNA = "CVD Research" would be used? Yes No
(This file ICTDER02 has been distributed to ARIC PIs, and contains the responses to consent updates related to stored sample use for research.)

8.a. Will the DNA data be used in this manuscript? Yes No

8.b. If yes, is the author aware that either DNA data distributed by the Coordinating Center must be used, or the file ICTDER02 must be used to exclude those with value RES_DNA = "No use/storage DNA"? Yes No

9. The lead author of this manuscript proposal has reviewed the list of existing ARIC Study manuscript proposals and has found no overlap between this proposal and previously approved manuscript proposals either published or still in active status. ARIC Investigators have access to the publications lists under the Study Members Area of the web site at: <http://bios.unc.edu/units/csc/ARIC/stdy/studymem.html>

Yes No

10. What are the most related manuscript proposals in ARIC (authors are encouraged to contact lead authors of these proposals for comments on the new proposal or collaboration)?

Manuscript #830 "Association between body composition and functional and self-rated health in a bi-ethnic cohort: The ARIC Study"

References

1. Martin, L. and B. Soldo, *Racial and Ethnic Differences in the Health of Older Americans*. 1997: National Academy of Sciences.
2. Manton, K., L. Corder, and E. Stallard, *Chronic disability trends in the elderly United States populations: 1982-1994*. Proc Nat Acad Sci, 1997. 94: p. 2593-8.
3. Harris, T., et al., *Longitudinal study of physical ability in the oldest-old*. Am J Public Health, 1989. 79: p. 698-702.
4. Scott, W., et al., *Functional health status as a predictor of mortality in men and women over 65*. J Clin Epidemiol, 1997. 50: p. 291-6.
5. Brill, P., et al., *Effect of body mass index on activity limitation and mortality among older women: the National Health Interview Survey, 1986-1990*. J Women's Health, 1997. 6: p. 435-40.
6. Idler, E., L. Russell, and D. Davis, *Survival, functional limitations, and self-rated health in the NHANES I Epidemiologic Follow-up Study, 1992*. Am J Epidemiol, 2000. 152: p. 874-83.
7. Idler, E. and Y. Benyamini, *Self-rated health and mortality: a review of twenty-seven community studies*. J Health Soc Behav, 1997. 38: p. 21-37.
8. National Center for Health Statistics, *Health and Aging Chartbook. Health, United States, 1999*. 1999, Hyattsville, MD: National Center for Health Statistics.
9. Wolinsky, F., et al., *Measurement of the global and functional dimensions of health status in the elderly*. J Gerontol, 1984. 39: p. 88-92.
10. Johnson, M., et al., *Nutritional patterns of centenarians*. Int J Aging Hum Dev, 1992. 34: p. 57-76.
11. Maaravi, Y., et al., *Nutrition and quality of life in the aged: the Jerusalem 70-year olds longitudinal study*. Aging Clin Exp Res, 2000. 12: p. 173-9.
12. Jensen, G., et al., *Nutrition risk screening characteristics of rural older persons: relation to functional limitations and health care charges*. Am J Clin Nutr, 1997. 66: p. 819-28.
13. Duffy, M. and E. MacDonald, *Determinants of functional health of older persons*. Gerontol, 1990. 30: p. 503-9.
14. Boulton, C., et al., *The validity of nutritional status as a marker for future disability and depressive symptoms among high-risk older adults*. J Am Geriatr Soc, 1999. 47: p. 995-9.
15. Osler, M., et al., *Food intake patterns, self-rated health and mortality in Danish men and women. A prospective observational study*. J Epidemiol Community Health, 2001. 55: p. 399-403.
16. Manderbacka, K., O. Lundberg, and P. Martikainen, *Do risk factors and health behaviours contribute to self-ratings of health?* Social Sci Med, 1999. 48: p. 1713-20.
17. Stafford, M., et al., *Behavioural and biological correlates of physical functioning in middle aged office workers: the UK Whitehall II study*. J Epidemiol Community Health, 1998. 52: p. 353-8.
18. Lammi, U., et al., *Functional capacity and associated factors in elderly Finnish men*. Scand J Soc Med, 1989. 17: p. 67-75.
19. Ensrud, K., et al., *Correlates of impaired function in older women*. J Am Geriatr Soc, 1994. 42: p. 481-89.
20. Pradignac, A., et al., *Relationships between macronutrient intake, handicaps, and cognitive impairments in free living elderly people*. Aging Clin Exp Res, 1995. 7: p. 67-74.
21. Michael, Y., et al., *Health behaviors, social networks, and healthy aging: cross-sectional evidence from the Nurses' Health Study*. Qual Life Res, 1999. 8: p. 711-22.
22. Pinsky, J., P. Leaverton, and J. Stokes III, *Predictors of good function: the Framingham Study*. J Chron Dis, 1987. 40: p. 159s-67s.
23. Guralnik, J. and G. Kaplan, *Predictors of healthy aging: prospective evidence from the Alameda County Study*. Am J Public Health, 1989. 79: p. 703-8.
24. LaCroix, A., et al., *Maintaining mobility in late life: smoking, alcohol consumption, physical activity, and body mass index*. Am J Epidemiol, 1993. 137: p. 858-69.
25. Ebrahim, S., et al., *Locomotor disability in a cohort of British men: the impact of lifestyle and disease*. Int J Epidemiol, 2000. 29: p. 478-86.
26. Bianchetti, A., et al., *Nutritional intake, socioeconomic conditions, and health status in a large elderly population*. J Am Geriatr Soc, 1990. 38: p. 521-6.
27. Sonn, U., E. Rothenberg, and B. Steen, *Dietary intake and functional ability between 70 and 76 years of age*. Aging Clin Exp Res, 1998. 10: p. 324-31.
28. Dontas, A., J. Moschandreas, and A. Kafatos, *Physical activity and nutrition in older adults*. Public Health Nutr, 1999. 2: p. 429-36.