



# Food Insufficiency and the Nutritional Status of the Elderly Population

INSIGHT 18

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Studies have shown that food insufficiency, defined as “an inadequate amount of food intake due to lack of resources” (1), is found in the US population of all ages. A few reports have shown that food insufficient people eat less than the food sufficient population, but no studies have reported on the overall nutritional status of food insufficient people. Therefore, using data from the third National Health and Nutrition Examination Survey (NHANES III), we compared the nutritional status of food insufficient versus food sufficient people 65 years of age and over. The results of our analysis provide a glimpse of the potential differences in nutritional status between food sufficient and insufficient individuals.

## Data

NHANES III, conducted between 1988 and 1994 by the National Center for Health Statistics of the Centers for Disease Control and Prevention, was a cross-sectional representative sample of the US non-institutionalized population (2). The goal of the survey was to collect national health and nutrition data to estimate the prevalence and distribution of selected diseases and risk factors.

Food sufficiency status of survey participants was determined by asking them if the food eaten by them and/or their families was “...enough food to eat, sometimes not enough food to eat, or often not enough to eat.” The respondents were considered to be food insufficient if they responded positively to “sometimes not enough food to eat, or often not enough to eat.”

In this study we examined differences in nutritional status between food sufficient and insufficient people by using information on dietary intake, blood levels of vitamins and minerals, measured body weight and height and by a self-reported health assessment. Data of 3,885 people 65 years of age and over who had complete dietary information were used in this study. The number of food insufficient older people was small (n=113) which prevented detailed analysis. However, mean nutrient values from food and from blood were tested for significant differences between the two groups after taking into account the survey’s study design and applying appropriate population weights. Also, we compared the distributions of sociodemographic characteristics such as household income, age, gender, marital status and education; and body composition measures and self-reported health status. All reported differences were statistically significant at the 0.05 level. Because of the relatively small number of individuals from food insufficient

households, the results should be viewed with some caution. We present these results in the Table.

## Demographic Information

The mean age of this population group was 72.3 years. No significant age differences were found between food sufficient and insufficient groups. About 48 percent of the population were men and 52 percent were women. There were no differences in gender distribution between the two groups. However, food sufficient people were more likely to be married and had a significantly higher number of years of education.

## Nutrition Assessment

**Dietary Intake:** Food intake was measured by collecting a 24-hour dietary recall. Food insufficient older people had significantly lower mean intake of calories and the macronutrients: protein, fat and carbohydrate. They also had lower mean intake of some B vitamins (thiamin, niacin, vitamin B<sub>6</sub>, folacin, vitamin B<sub>12</sub>) and the minerals: iron and zinc. These vitamins and minerals are important to the immune system and cognitive function. Therefore, individuals deficient in these vitamins and minerals may be more prone to infections and may be at higher risk of chronic diseases and cognitive dysfunction (3). Analysis of food group intake indicated that food insufficient people ate significantly fewer servings of meat and vegetables, and had a significantly lower variety of foods eaten.

**Biochemical Assessment:** The serum of survey participants was measured for several vitamins and minerals. People who reported being food insufficient had significantly lower serum levels of folate; the antioxidant nutrients vitamin C, and vitamin E, and the carotenoid components  $\beta$ -carotene, cryptoxanthine and lutein/zeaxanthin. Antioxidants are believed to be associated with the prevention and delay of chronic diseases such as cataracts and possibly cancer and heart disease by fighting the damaging effects of oxidation to the body (4). Also, low levels of folic acid and other B vitamins may result in an accumulation of homocysteine in the body which has been strongly linked to an increased risk in cardiovascular disease (5, 6).

**Body composition measurements:** Body mass index (BMI), an indicator of body fat, is calculated using measured body weight and height. The results of this study indicate that those individuals in the food insufficient group were at higher risk of having a BMI below 19, a level considered as underweight.

Studies have shown a higher prevalence of early mortality among elderly people in the underweight category (7). This increased mortality may be an outcome of a lower resistance to diseases but was also attributed to other causes such as inclusion of smokers and people in poor health in the underweight category. No significant differences were found in the proportion of obese people (BMI >30.0) in the two groups.

*Self-reported health:* Self-reported health represents physical, emotional and social aspects of health and well-being and correlates highly with the risk of mortality (8). Therefore, we used this variable as a proxy for clinical data. Compared to food sufficient people, those who were food insufficient reported more frequently being in fair or poor health versus excellent, very good or good.

### Poverty and food insufficiency

There is a strong relationship between food insufficiency and poverty. Seventy-nine percent of food insufficient people in this survey had an income below 130% of the poverty level (the cut-off for food stamp eligibility). However, food insufficiency is not limited to poor people. Among the elderly, other factors may contribute to food insufficiency, such as decreased mobility, inability to care for oneself and limited help with daily activities. All these factors may contribute to the inability to purchase and prepare food and consequently lead to food insufficiency.

### Overall findings

The results, overall, indicate the following for older people who reported food insufficiency: lower mean intake of several nutrients; lower intake of the vegetable and meat groups; lower dietary variety; lower mean serum levels of certain nutrients; higher risk of being underweight, and in poor or fair health (see Table).

Considering that older people are at risk of malnutrition, our results indicate that food insufficient elderly people are an especially vulnerable population. If all older people are to maintain or acquire a healthy lifestyle, then outreach to the food insufficient elderly must be developed and implemented. Also, gaps in the safety net must be identified and remedied and food assistance and nutrition education efforts improved.

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**Table. Statistically Significant (P<0.05) Mean Differences By Food Sufficiency Status**

CHARACTERISTICS	SUFFICIENT N=3768	INSUFFICIENT N=113
<u>Demographics</u>		
BMI < 19 (%)	3	14
Health is Poor (%)	30	65
Under 130% of Poverty (%)	21	79
Married (%)	57	31
Schooling (Years)	11.0	7.7
<u>Dietary Assessment</u>		
Kcalories	1699	1421
Protein (g)	67.2	56.6
Carbohydrate (g)	216	185
Fat (g)	62.5	52.1
Thiamin (mg)	1.56	1.28
Niacin (mg)	20.8	16.0
B6 (mg)	1.82	1.35
Folacin (µg)	299	222
B12 (µg)	4.6	3.3
Iron (mg)	14.9	10.6
Zinc (mg)	10.6	7.6
Meat (Servings)	1.7	1.4
Vegetables (Servings)	3.2	2.3
Variety (score 0-10)	8.1	6.5
<u>Serum Levels</u>		
Folate (nmol/L)	22.4	14.2
Vitamin C (mmol/L)	51.1	35.7
Vitamin E (µmol/L)	33.2	27
Beta Carotene (µmol/L)	0.5	0.4
Cryptoxanthin (µmol/L)	0.18	0.15
Lutein/Zeaxanthin (µmol/L)	0.44	0.38

Source: Third National Health and Nutrition Examination Survey

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**Authors:** Nadine Sahyoun, Ph.D., Nutritionist and P. Peter Basiotis, Ph.D., Economist and Director, Nutrition Policy and Analysis Staff, Center for Nutrition Policy and Promotion, USDA.



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