

## NUTRITION IN MINORITY ELDERS: CURRENT PROBLEMS AND FUTURE DIRECTIONS

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*Abstract: Nutrition and aging are inseparably connected as eating patterns affect the progress of many degenerative diseases associated with aging. In turn, the nutritional status of the elderly, particularly minority elders (the most rapidly growing segment of the population in the United States), may be adversely affected by a number of factors associated either directly or indirectly with aging. Because reducing morbidity through health promotion and disease prevention could both improve the quality of elderly life and lessen the burden on the health care system, it would seem reasonable that such efforts, including nutrition education, in minority elderly would be of benefit. The extent of the potential value of such preventive programs, however, remains uncertain, and the task of determining nutrient needs of the elderly difficult. Special studies are required to describe the association of nutrition-related factors with chronic diseases, particularly those prevalent in minority elders.*

*Key words: Nutrition, elderly, minority*

According to the National Center for Health Statistics, life expectancy for Americans rose in 1991 to a record 75.5 years.<sup>1</sup> The Census Bureau predicts that by the year 2020 the average life expectancy for women will be 82 years and for men 74.4 years, and that the population aged 65 and older will outnumber those under the age of 15. Currently, only 14 percent of the 44 million people over the age of 60 are in minority groups. The racial and ethnic minorities identified by the U.S. Census as African American, Hispanic, Asian/Pacific Islander, or Native American accounted for 22 percent of the overall U.S. population in 1990.<sup>2</sup> By the year 2030, the number of white elderly is expected to grow by 197 percent while numbers of older African Americans and Hispanic Americans are expected to grow by 300 percent and 395 percent, respectively.<sup>3</sup> Immigration is a primary factor in this projected growth. Com-

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bined with a projection that the number of older Asian Pacific and Native American persons will grow by 200-300 percent, the proportion of minority elders will increase to about 25 percent of the older population in the next century.<sup>4</sup>

In general, national statistics suggest differences in health status indicators between minority groups and whites in the United States. For example, by some estimates, African Americans suffer an all-cause mortality rate that is 49 percent higher among men 53-70 years of age than in similarly aged white men.<sup>5</sup> These higher mortality rates among African American men are largely attributable to cancer, heart disease, stroke, cirrhosis, and diabetes mellitus.<sup>6-9</sup> Likewise, other minority groups tend to fare poorly in most diet-related health status comparisons with whites. Hispanics, for example, are at an increased risk for diabetes mellitus, obesity, hypertension, and some cancers.<sup>10,11</sup> Native Americans and Asian/Pacific Islanders are at increased risk for hypertension, obesity, and diabetes.<sup>12,13,14</sup> African Americans are also at a disadvantage in cancer-related deaths, with a five-year cancer survival rate at only 38 percent compared with a 50 percent survival rate in whites.<sup>6</sup>

Substantial scientific research over the past few decades indicates that diet plays an important role in the prevention of these diseases, which remain leading causes of death and disability in the United States.<sup>15</sup> While the role of specific nutrients in these diseases has not been definitively established, epidemiologic and laboratory studies offer important insights that may help minority elders make food choices that will enhance their prospects of maintaining health.

### Physiological changes due to aging

Various physical functions deteriorate with advancing age. Reserve and storage capacities of several organs and organ systems decline, as do recovery and regulatory abilities—although these changes depend substantially on individual conditions.<sup>16</sup> Physiological aging may affect gastrointestinal functions and cause a decrease in lean body mass, total body water, and bone density. These changes usually occur in conjunction with decrease in intensity and duration of physical activity and with increases in body fat and serum cholesterol level. The exact mechanisms for this age-associated increase in serum cholesterol are unknown, but it is speculated that changes in the regulation of low density lipoprotein (LDL) receptors may mediate the increase of the serum LDL level.<sup>17</sup> Plasma glucose levels increase with advancing age as the result of progressive changes in insulin action and metabolism, and the incidence of non-insulin-dependent diabetes mellitus (NIDDM) increases with age and increased body fat. In addition, the pancreatic responsiveness to oral glucose challenge in terms of insulin release from the pancreas is progressively impaired with advancing age.<sup>13</sup>

Changes in sex hormones and trophic hormones occur in both sexes with aging.<sup>18</sup> In women, the most significant change is the cessation of estrogen secretion after menopause.<sup>18</sup> In men, there is a gradual diminution in testosterone level. Levels of gonadotropins in women reach a maximum level two to three years after menopause and remain elevated throughout later life.<sup>19</sup> The physical consequences of menopause, namely osteoporosis and an increased risk of cardiovascular disease due to lack of estrogens, are well recognized as perhaps the most serious and obvious of such changes. In addition, age-related bone loss occurs in both men and women of all ethnic backgrounds.<sup>20</sup> It has been reported, however, that African Americans have higher bone mass and therefore lower fracture rates than whites.<sup>21,22,23</sup> Age-specific rates of incidence of hip fracture are about twice as high in white women as in African American women. Most studies also indicate a higher risk of hip fractures among white men as compared with African American men.<sup>24</sup> Mexican American populations have lower fracture rates than whites but slightly higher rates than African Americans.<sup>25</sup> The etiology of this disparity is unknown, but the cause may be due to genetic differences in bone homeostasis. Previous studies linked increased bone mass with lower serum 25(OH) vitamin D concentration, lower urinary calcium excretion, and lower serum calcium levels in African Americans.<sup>26-28</sup> Recently, it has been suggested that in African American women a mechanism or mechanisms other than the vitamin D-parathyroid hormone (PTH) axis are responsible for a racial difference in bone mass, but this hypothesis requires further study.<sup>29</sup> In addition, geographical differences may be linked to differences in diet, degree of physical activity, and exposure to sunlight.<sup>30</sup>

Decline of renal function with aging is the most dramatic age-related change of all the organ systems.<sup>31</sup> Functioning cells are gradually lost and physiological reserve capacity is reduced. The precise mechanism of the age-related changes in the kidneys have not been hitherto elucidated. At least two separate subcomponents seem to exist in the aging process of the kidneys. One component is an essential renal change resulting from the natural aging process that is common to all human beings to some degree. Another is the influence of some pathophysiological condition that can take place intermittently or continuously throughout a person's life.<sup>32</sup> Hypertension, polypharmacy, various infections, and dehydration are examples of some pathophysiological conditions that can be responsible for age-related renal dysfunction.<sup>17</sup>

It is commonly believed that intestinal function declines significantly with increasing age. Some disorders such as diverticulosis and ischemic bowel disease occur primarily in the elderly. Several age-related alterations in gastrointestinal function may increase the vulnerability of the elderly to illness and malnutrition.<sup>33</sup> Gastric atrophy may have a significant effect on calcium and vitamin B<sub>12</sub> absorption, but efficient digestion and absorption of macro- and micronutrients seem to be maintained in healthy elders. Aging also affects the physiological functions linking behavior to food intake. The effect may go beyond mastication.

tion, digestion, and absorption to cellular metabolism, and even to the nervous system.<sup>34</sup> For example, a decrease in the sense of taste and a decrease in appreciation of taste quality is often reported by the elderly.<sup>35</sup> Enhancing the flavor of foods or changing the balance of spices and salt could increase the intake of food in the elderly. It is also possible that flavor enhancement might restore sensory specific satiety in the elderly and encourage consumption of a wider variety of foods.<sup>36</sup> Before special foods are produced for the elderly, more information is needed on the impact that these foods are likely to have. Both laboratory and population studies are required in individuals of different ages and from different ethnic backgrounds so the effect of these factors on normal eating behavior can be established.<sup>37</sup>

### **Energy and nutrient requirements of the elderly**

Energy and nutrient intake considered adequate for the elderly are often derived by extrapolation from younger age groups, partly by taking the changed energy needs under consideration.<sup>38</sup> The commonly used standard, the Recommended Dietary Allowances (RDA), offers guidelines for levels of nutrient intake that are sufficient to meet the needs of almost all healthy individuals.<sup>39</sup> Previous and most recent editions of the U.S. RDA provide guidelines for assessing the intake of energy and specific nutrients for adults up to the age category of 51 years and above.<sup>39</sup>

With age there is a gradual decline in food intake that corresponds to lower energy expenditure. Age-related changes in energy balance, usually beginning after the age of 65-70 years, are associated with the loss of weight and lean body mass.<sup>40</sup> On average, with advanced age there is a gradual 10 to 20 percent decline in resting metabolic rate (RMR),<sup>41</sup> which is typically accompanied by a reduced thyroid hormone activity and a reduced responsiveness to norepinephrine.<sup>42</sup> Lowered energy requirements, however, are more closely associated with a decrease in energy expenditure for physical activity than they are to the decrease in RMR. Other factors such as body temperature, diet-induced thermogenesis, and sympathetic nervous system activity are of little relevance in age-related changes of daily energy expenditure.<sup>43</sup> Although the recommended allowance for reference protein (0.75 g/kg of body weight) is accepted to be the same for the elderly as it is for young adults,<sup>39</sup> it has recently been suggested that a safe protein requirement for the elderly should be 1.0-1.25 g/kg of body weight per day of high-quality protein.<sup>44</sup>

It is recommended that, in general, the fat content of the diet not exceed 30 percent of energy intake, that less than 10 percent of energy should be provided from saturated fatty acids, and that dietary cholesterol should be less than 300 mg/day.<sup>39</sup> For the elderly, restricting dietary fat, thereby reducing energy intake, is a reasonable strategy to maintain energy balance without restricting intake of other nutrients. The vitamin supply requirements of elderly persons are similar to those of younger persons. Data currently available do not permit

the definite conclusion that there is an age-specific vitamin requirement.<sup>38</sup> However, it can be stated with some certainty that there is an increased need for vitamin B<sub>6</sub>, riboflavin, and vitamin D in the elderly. Additionally, in immobile elderly who spend relatively brief periods outdoors, ultraviolet radiation received from sun exposure is limited and in amounts insufficient to synthesize enough vitamin D to satisfy their requirements.<sup>45</sup> Thus there is a growing population at risk for vitamin D deficiency in which vitamin D supplementation may be necessary. Since about 40 percent of the free-living elderly have a poor vitamin B<sub>12</sub> status, the requirements for this vitamin should probably be elevated from 2 µg/day to 3 µg/day.<sup>46,47,48</sup> There is evidence that the dietary need for vitamin A in the elderly either stays the same or decreases.<sup>49</sup> The present RDAs for elderly people appear to be appropriate for thiamin, vitamin C, and folate.<sup>50</sup> There are not enough data to make a judgment on the appropriateness of the RDAs or safe and adequate intakes of vitamin K, niacin, biotin, and pantothenic acid in elderly persons.<sup>50</sup> In addition, the insufficient vitamin status often present in very old multimorbid patients is more a result of accompanying sickness or psychological disorders than of old age.<sup>51,52</sup>

Knowledge of mineral element status and requirements in older people is incomplete and, for most elements, also derived by extrapolation from younger age groups.<sup>53</sup> This is partly due to the limited methods available for assessing the mineral status of several minerals. In addition, there is a general lack of information about mineral status and metabolism in very old people (those over the age of 85 years).<sup>54</sup> The RDAs for zinc, iron, and selenium appear adequate for the elderly.<sup>55</sup> However, current recommendations for calcium may be too low, whereas those for magnesium and chromium may be higher than necessary. For phosphorus, iodine, manganese, fluoride, and molybdenum the available data are insufficient to make a judgment on the appropriateness of the dietary recommendation for elderly people.<sup>55</sup>

In summary, the dietary needs of the "healthy" elderly may prove to be generally similar to those of younger adults as implied by current RDAs. However, there are some indications that for energy and some nutrients there may be differences in metabolism and utilization not just between adults and elderly but also between younger and older elderly people. Therefore, RDAs based on the age category of "51 years and above" alone may be misleading and of little use to different population groups of the elderly as well as individual older persons. An alternative approach may be to derive formulas for individualizing the adult RDA for each nutrient by including coefficients for such factors as age, the presence of specific disease, and laboratory test results.<sup>56,57,58</sup> The RDAs may also be more meaningful when used in conjunction with a food-based system for assessing dietary adequacy, such as the Food Guide Pyramid. Although no data have been reported to make specific recom-

mendations for elderly from various ethnic groups, nutritional requirements of these groups should be also identified to facilitate appropriate nutritional assessment.

### **Physical activity in the elderly**

Physical activity is the major influence on average energy expenditure, and therefore the way to prevent reduction in total daily energy expenditure with aging is to maintain an active lifestyle. Physical activity favors increased bone mineral density, especially if the diet provides adequate calcium and other nutrients throughout life. In addition, regular aerobic and resistive exercise may increase or preserve lean body mass, which has been shown to decrease with age. Age-related reductions in muscle are a direct cause of the age-related decrease in muscle strength,<sup>59</sup> which, in turn, is a major cause of increased prevalence of disability and falls among the elderly.<sup>60</sup> Loss of skeletal muscle contributes also to decreases in insulin sensitivity, bone density, and energy requirements. However, skeletal muscle is responsive to strengthening exercises at any age, and elderly people should be encouraged to do strength-training activities.<sup>61</sup> Since physical activity requires additional energy, it is possible that the current RDA may significantly underestimate the energy requirements caused by physical activity in healthy elderly persons.<sup>62</sup> This underestimation may be due to a failure to fully account for habitual energy expenditure for nonstrenuous physical activity and arousal.<sup>63</sup> It has also been suggested that regular strenuous physical activity in older adults may require some changes in protein, mineral, and vitamin intake to compensate for exercise-induced increases in metabolism and loss of minerals in sweat.<sup>64</sup> On the other hand, many elders, especially the institutionalized, are not physically active, which gives rise to low needs for energy and therefore difficulties in maintaining a sufficient intake of essential nutrients. A number of barriers, such as deteriorating health, lack of knowledge, limited access, and lack of support for participation in programs restrict physical activity of the elderly.<sup>65</sup> Although specific information is not available, minority elderly may find that limited access to services is a major barrier in participating in fitness and health promotion programs.<sup>66</sup>

In summary, an active lifestyle positively affects the nutritional, physiological, psychological, and social status of the elderly. Benefits to be obtained include greater physical mobility, larger nutritional intake, increased bone density, and lower risk of malnutrition.<sup>67</sup> Habitual exercise is useful for ameliorating many conditions and diseases of older persons, such as diabetes mellitus or cardiovascular disease. Most elderly can benefit from a properly designed exercise program.

### Malnutrition at home and in long-term care facilities

Epidemiological studies commonly demonstrate nutritional deficiencies in elderly populations.<sup>57,68</sup> Other studies have identified elderly groups nutritionally at risk of under- or over-nutrition through medical, physiological, or socioeconomic conditions.<sup>69-74</sup> For example, it has been estimated that 30 to 60 percent of institutionalized elderly show signs of energy deficiency compared with 3 percent of healthy free-living elderly.<sup>75</sup> However, marginal nutrient deficiencies in the latter population may easily go undetected since many subclinical deficiency symptoms may be confused with signs of old age.<sup>76</sup> In the elderly, especially those institutionalized, energy and protein deficiency becomes more common. Prevalence in this population ranging from 30 to 60 percent has been reported.<sup>77,78</sup> The variance in these estimates is the result of the differences in study methods employed, the type of institution in which studies were conducted, and the diagnostic criteria.<sup>79</sup> Among the hospitalized elderly, protein-energy undernutrition is a common finding among all age, diagnostic, and prognostic groups. This condition is not restricted to patients who are critically ill or who have a near terminal disease such as advanced cancer or end-stage organ failure.<sup>79</sup> Without nutrition intervention many of these patients remain undernourished throughout their hospitalization and for variable periods subsequent to discharge.<sup>80</sup> This fact is important because it is now recognized that the presence of undernutrition and its inadequate treatment is accompanied by significant increases in morbidity, mortality, and health resource utilization.<sup>81</sup> It is unknown whether or not minority elders are affected by this type of undernutrition to a different extent than nonminority counterparts.

A recent study by Posner<sup>82</sup> and colleagues demonstrated that nutritional problems are also prevalent among free-living older Americans in New England, covering a wide spectrum of maladies ranging from excessive body weight and high levels of dietary lipids to underweight and less than recommended intakes of one or more essential nutrients. Herndon,<sup>83</sup> in a study of 245 elderly, estimated that 33 percent were in high nutritional risk and 39 percent at moderate risk. In a study of African Americans aged 74 years and older, Bernard, Anderson, and Forgey<sup>84</sup> found that 20 percent of the subjects had relatively low serum albumin levels, 14 percent had serum cholesterol levels below 160 mg/dl, and a subset of the population reported low intake during 24-hour dietary recall. In nursing homes, 30 to 50 percent of the residents are reported to suffer from protein-energy malnutrition and are substandard in body weight, midarm muscle circumference, and serum albumin concentration.<sup>85,86</sup> The acutely ill and dependent elderly are also notably less well nourished. Surveys of noninstitutionalized elderly persons from the latter population show that consumption of minerals and vitamins are below the RDA for up to 50 percent and that subnormal blood levels are found in 10 to 30 percent of this population.<sup>87</sup>

The aging process per se is not a cause of malnutrition in a healthy elderly population. Therefore it is a major challenge to differentiate the effects of normal aging from manifestations of treatable disease. Factors determining overall undernutrition in the elderly include environmental conditions and disease processes that affect their ability to consume food. It has been established that certain groups of elderly people are more likely than others to develop undernutrition. Such groups include elderly with poor socioeconomic status, the homebound (especially those living alone), the bereaved, persons who do not regularly have cooked meals, those with a physical disability, and those experiencing depression or other mental disorders. Social and behavioral causes together with alterations in metabolic and digestive functions might also affect nutritional status of the elderly person and ultimately lead to malnutrition in both institutionalized and noninstitutionalized elderly. In the former group, some of these factors, such as dysphagia, feeding dependency, and a number of feeding impairments are amenable to intervention.<sup>88</sup> In addition, factors such as tooth loss and poorly fitted dentures can severely limit the variety of foods consumed. Fifty percent of all Americans over the age of 65 have lost all their teeth, an important factor in their selection of foods.<sup>58</sup> Nearly 20 percent of the elderly suffer from xerostomia (dry mouth), a condition arising from salivary gland dysfunction associated with aging, which leads to problems in lubricating, masticating, tasting, and swallowing food.<sup>89</sup> Explanations for poor dietary intake in this group, often defined as anorexia of aging, are numerous, and they range from unappetizing food to complex issues such as multiple illnesses, wasting or cachexia, drugs, infections, and general lack of nutrients. Whether the true "anorexia of aging" exists independently of disease, medication, poverty, or psychosocial conditions that tend to suppress appetite is not clear.<sup>85</sup> It has been suggested that aging may be associated with a substantially reduced ability to regulate energy balance and control energy and food intake even in apparently healthy individuals.<sup>90</sup>

It is apparent that a broad spectrum of nutritional problems exists among both free-living and institutionalized elderly. These range from nutrient deficiencies such as protein-energy malnutrition to single-nutrient deficiency. Problems of nutrient inadequacies appear to increase with advancing age and are more common among the very old.

### **Obesity as a nutritional problem**

Conditions related to nutritional excess, such as obesity and dyslipidemia, are also common among the elderly. For example, up to 40 percent of the noninstitutionalized elderly 60 years of age or older are obese.<sup>82,91</sup> The prevalence of obesity differs among ethnic groups and genders. Although there is no difference between African American and white elderly males in the prevalence of obesity, more than 60 percent of African American women aged

65 to 74 years are obese, which is almost twice the prevalence among white elderly women (36 percent).<sup>92</sup> Bernard, Anderson, and Forgey reported that 40 percent of African Americans aged 74 years and older had a body weight that was at the 120th percentile or greater.<sup>84</sup> Similar prevalences of obesity among adults have been found among Native Americans, Hispanic Americans, and Pacific Islanders.<sup>93,94</sup> Other studies, however, have reported a much lower prevalence of obesity than that reported by the National Health and Nutrition Examination Survey (NHANES) II in a congregate meal recipient population of Hispanic elderly.<sup>95</sup>

Obesity is an independent predictor of cardiovascular heart disease (CHD),<sup>96</sup> which is the major cause of death and disability in older persons.<sup>97</sup> Excessive weight is associated with unfavorable changes in many CHD risk factors, including lipoprotein levels (total cholesterol, LDL cholesterol, HDL cholesterol, ratio of HDL to total cholesterol), systolic and diastolic hypertension,<sup>98</sup> glucose intolerance, insulin resistance,<sup>99</sup> and left ventricular hypertrophy.<sup>100</sup> Although the mortality from CHD has been declining for all ages during the past two decades, it is a major source of disability and health care expense in men and women over the age of 65.<sup>101</sup> Obesity, in addition to increasing cardiovascular risk and CHD-associated disability, impairs functional status among the elderly. Functional impairment, the inability to carry out ordinary activities of daily living, is one of the major factors predicting institutionalization of older adults and has been shown to be a predictor of mortality in the elderly.<sup>102</sup> In spite of this relationship, many physicians are reluctant to recommend dietary intervention, and healthy overweight elderly are rarely advised to lose weight. The reason is that although some studies of obesity in elders have demonstrated an association with excess mortality, other studies have shown no adverse association; some have even shown a beneficial effect. The possibility of compromising nutritional status is another objection raised about weight reduction for older adults. In addition, a common belief is that the elderly are unable or unwilling to change dietary habits acquired over a lifetime.

### **Drug-disposition, food-drug, and nutrient-drug incompatibilities**

Other nutritional problems in minority elders may be related to their use of various drugs or their consumption of specialized diets for one or more chronic illnesses. It is well known that the use of prescription drugs for chronic disease is more common in elderly persons than among younger adults. In addition, polypharmacy is common in geriatric populations, and adverse drug reactions cause up to 10 percent of hospitalizations among the elderly.<sup>103</sup> Certain prescription drugs cause malabsorption of some nutrients, particularly vitamins and minerals.<sup>104</sup> For example, cholestyramine, a cholesterol-lowering drug, interferes with the absorption of bile acids, vitamin D, and vitamin A. Diuretic agents, often given to control hypertension, not only prevent water retention

but also enhance the excretion of potassium and sodium through the urine.<sup>105</sup> Calcium-containing antacids decrease iron absorption, sodium-containing antacids interfere with blood pressure control, and aluminum-containing antacids can lead to muscle weakness.<sup>106</sup> Some laxatives reduce absorption of vitamins A, D, E, and K. Uncoated aspirin can cause iron-deficiency anemia in the elderly by inducing blood loss from the gastrointestinal tract.<sup>106</sup> On the other hand, nutrients can affect drug action by altering the digestion, absorption, distribution, metabolism, and/or excretion of a drug.<sup>107</sup> High amounts of vitamin K may interfere with the desired anticoagulant activity of drugs such as warfarin.<sup>108</sup> Adverse outcomes of these interactions relative to vitamin disposition include impaired utilization of nutrients and urinary hyperexcretion.<sup>109</sup> Severe folacin deficiency with megaloblastic anemia has been associated with sulfasalazine, a drug used in chronic ulcerative colitis, when treatment has extended beyond a period of five months.<sup>110</sup> Abnormal metabolism and utilization of certain nutrients in the elderly may impair the functioning of some organs, resulting in malnutrition. This can also affect nutritional status of the elderly directly by altering dietary intakes.

Current difficulties in developing guidelines for levels of vitamin supplements for use by elderly who are taking therapeutic drugs pertain to a lack of consensus on whether vitamin levels or other measures of vitamin status should be used in calculations.<sup>111</sup> More than one-third of all U.S. adults take nonprescription vitamin and mineral supplements. Of persons aged 65 years and over, about 40 percent of whites and Hispanics take vitamin and mineral supplements compared with about 14 percent of African Americans.<sup>112</sup> Monitoring vitamin status and ensuring that the elderly receive a daily nutrient intake that is commensurate with their physiological and pharmacological needs is very important for the elderly patient and for the caregiver. In addition, it is important in minority elders to identify potential use of home remedies, which are often pharmacologically active.<sup>113</sup>

Although there are no reports showing influence of ethnicity on drug-nutrient interactions, it has been reported that there is an interaction of race and age on the effectiveness of some pharmacological and nonpharmacological treatments. For example, it has been found that, on average, beta-adrenergic blockers are less effective in treating hypertension in African Americans than in whites.<sup>114</sup> It is unclear if this race difference is maintained across all age groups, nor is it clear whether characteristics other than ethnicity predict treatment response in minority elders.

The use of traditional nonmedical remedies is known in some ethnic groups and are often part of the key to ethnic identity.<sup>115</sup> Despite a generally weaker pharmacopoeia and the absence of scientific method, folk medicine has persisted on some level because it addresses a central human need for balance and integration. The use of such treatments as spiritual healing, herbal remedies, alternative healers, and teas and other potions are part of the philosophy of health and well-being.<sup>116</sup> According to Brangman, many older African Americans depend on a variety of salves, teas, herbs, and over-the-counter

patent medicines for self-treatment,<sup>117</sup> the use of which may not be disclosed to their provider. These remedies may be combined with standard prescriptions, increasing the risk of drug interactions. Quatromoni and colleagues<sup>118</sup> described the use of native herbs, liquid mixtures and extracts, and folk medicines to treat diabetes among urban Caribbean Latinos. Common treatments among Asian elders involve herbal medicines, acupuncture, acupressure, massage, moxibustion, and cupping.<sup>119</sup> Plants used as medicinal agents may also be used as additives or seasonings in the diet to increase appetite, weight, strength, and energy and to promote good health.<sup>120</sup> Asian elders may use herbal medicines for allergies, cough, asthma, stomach and bowel problems, hypertension, and general health maintenance.<sup>119</sup> Ginseng, a commonly used herb, may have some antihypertensive properties.<sup>121</sup> Some traditional medications used in conjunction with other medications may have similar cumulative effects. Homeopathic behaviors and beliefs may exist among other ethnic minorities and should be further investigated.

### **Cultural and societal issues**

Societal issues such as poverty and substance abuse affect the eating and nutritional status of the elderly of different minority groups. The poverty rate for elderly couples is lower (4 percent) than for elderly persons living alone (19 percent). The rate of poverty for African Americans and Hispanics is at least double that of whites, with the highest rate being that of African American women aged 85 and older living alone (73 percent).<sup>122</sup>

Several environmental factors are known to affect the nutritional status of the elderly. Socioeconomic conditions and physical barriers such as preparation facilities and shopping distance affect their diet. Social isolation may influence their appetite and desire to prepare food, and knowledge of food selection determines how they meet their nutritional needs.<sup>123</sup> Poverty, however, has been identified as a critical determinant of diet inadequacies among the elderly. Dietary inadequacy is considered to be present at home if the individual is reporting eating less than seven hot meals per week, going one or more days per week without food, or having one or more days in the week with too little food to eat.<sup>124</sup> Posner emphasized that those elderly with very low incomes not only have less money to spend on food, but they also may have more disabilities that diminish food access than less indigent elderly, who have better health care.<sup>125</sup> Posner also proposed that these disabilities further decrease the ability of these elderly men and women to obtain a diet that meets nutritional requirements.

Dietary problems among inner-city, homebound minority elders are linked not only to poverty but also to loss of mobility as well as lack of in-home food assistance. In a 1990 survey of nutritional risks among the elderly, approximately 65 percent surveyed were participating in an organized "service" for elderly or low-income people, approximately 30 percent of whom showed signs of nutritional risk.<sup>126</sup> Interestingly, being underweight was more prevalent

among nonminority (39 percent) than minority (19 percent) elders. Of the 12 percent of service recipients who were overweight, 80 percent were minority elders who were more likely to report having hypertension and diabetes. It has been shown that compared with nearly half (54 percent) of whites aged 65 to 74 years, almost three-fourths (72 percent) of African Americans and one-fifth (20 percent) of Hispanics from the same age group have hypertension (defined as systolic blood pressure higher than 140 mm Hg and/or diastolic blood pressure higher than 90 mm Hg, or the use of antihypertension medications).<sup>127</sup>

As common as it is among the elderly, hypertension is not benign. It is the chief factor in stroke—the cause of 150,000 deaths in the United States each year—and a major risk factor for the 1 million heart attacks that occur annually, 500,000 of which result in death. Hypertension also contributes in a substantial way to kidney disease.<sup>128</sup> The prevalence of diabetes is also greater in minority elders than in nonminority elders. It has been found that hospitalization due to hypertension and diabetes occurs more often among minority than nonminority elders. This occurrence has been linked to a cluster of risk factors that may explain such racial/ethnic morbidity differences.<sup>129</sup> These factors include obesity, hypercholesterolemia, and cigarette smoking. Severe disabilities that decrease ability to acquire food are also associated with these diseases.

Approximately one-quarter of Americans aged 65 and older live in rural areas.<sup>125,130</sup> Homebound rural elderly are hard to reach and are often poor and frail. The rural elderly are more likely than their inner-city counterparts to live below the poverty level, to have a larger number of health problems, and to have fewer available health and human services.<sup>131</sup>

A major concern for the elderly is how health care costs can be kept at a minimum while maintaining a decent quality of life in old age. Since poor nutrition increases health problems and health care costs, the answer to keeping these costs as low as possible, without sacrificing necessary care, involves careful attention to the nutritional needs of the elderly.<sup>132</sup> Therefore identifying nutritional problems and assessing dietary needs of the elderly of all ethnic and socioeconomic backgrounds should be of concern to the public and private sector when planning and providing food and home-delivered meals.

### **Nutritional assessment, screening, and monitoring**

Nutrition assessment is probably more important in the elderly than in many other population groups. Standards and methodologies for assessing nutritional status of the elderly have, for the most part, been derived from younger adults.<sup>133</sup> Despite the lack of reliable assessment standards, any older person can be compared against himself or herself over time. Recording serial or repeated measures at regular intervals and expressing change as a percentage of usual or previous measurement provides a useful base for nutrition decisions. Age clearly influences anthropometric, hematological, biochemical,

immunologic, clinical, and dietary parameters independent of changes in nutrition.<sup>134</sup> In addition, functional assessment defined as an evaluation of a person's ability to perform specific activities related to daily living should be considered as a comprehensive nutritional assessment. This functional assessment evaluates sensory perception, dental condition, coordination, mental status, respiratory status, swallowing evaluation, mobility, and level of assistance required at mealtime.<sup>135</sup> Identifying warning signals of nutritional risk is a first step in maintaining quality of life and functional status of the older person.

The concept of warning signals has led to the Nutrition Screening Initiative, which is designed to identify elderly individuals who are at risk of nutritional problems or who have poor nutritional status.<sup>136</sup> The Nutrition Screening Initiative has adopted a basic consensus position in the prevention, reduction of risk factors, and management of poor nutritional status. Another set of measurements that collectively provides the information of a population's or an individual's health as influenced by the intake of nutrients and nonnutrients are nutritional surveys conducted on a national or local level.<sup>137,138</sup> One of such on-going surveys is the National Health and Nutrition Examination Survey (NHANES), conducted periodically to assess nutritional status of Americans, including the elderly.<sup>139</sup> With their ability to assess dietary intake, nutritional status, dietary risk for chronic disease, and the extent of hunger in the population, dietary and nutrition status surveys are of great relevance to the nutrition problems of the elderly. There is still, however, a gap in the current nutrition monitoring system. Minority elders have not been adequately represented in all national surveys and should be sampled in sufficient numbers to permit assessment of minority subgroups such as the elderly (65-74 years of age), the aged (75-84 years of age), and the very old (85 years of age and older).<sup>140</sup> In addition, improved methods are needed to monitor the nutritional status of the oldest individuals and population groups, including the institutionalized elderly.

### **Nutrition services for elders**

Approximately 5 percent of Americans over the age of 65 reside in institutions, and about four times that number are homebound.<sup>141</sup> Surveys show that older people prefer to live in their own homes and communities rather than in institutional settings, but many need home and community-based services to do so.<sup>142</sup> Approximately 6.1 million older people living in the community experience difficulty with one or more activities of daily living, such as eating, bathing, dressing, toileting, or transferring in and out of bed. However, less than half of these individuals receive personal help. At the same time, because of medical advances and the availability of community-based services such as home-delivered meals, more older persons are able to remain independent

and in their own homes. Some of the homebound elderly are recipients of meals authorized by the Older American Act (OAA), including Title VII, which provides formula grants to states to pay for the establishment and operation of low-cost meal programs for people over sixty.<sup>143</sup> For a nominal fee, meals are served five days per week in community settings or delivered to those who are homebound.<sup>143</sup> In the 1980s, three amendments to the OAA placed emphasis on targeting services to low-income minority and frail elderly persons, including the need for more in-home services.<sup>144</sup> Despite these directives and the high vulnerability of many elderly minorities, only 4.9 percent of all congregate meal recipients were Hispanics according to fiscal year 1988 estimates, and these recipients represented only 13 percent of the eligible Mexican-American population.<sup>95</sup> There are several potential barriers, such as knowledge related to the service, access to the service, and intent to use the service, that may prevent minority elders from the use of available nutritional services.<sup>145</sup>

Senior Nutrition Centers, initiated under the auspices of the OAA, are considered to be one of the more successful government-sponsored programs for the elderly.<sup>146</sup> The goals of the centers include providing low-cost meals in congregate settings or through home delivery; reaching hard-to-reach elderly, such as minorities; encouraging well-being; providing nutritional information; and providing other social services. It has been reported that these centers are essential in providing support for target populations.<sup>147</sup>

Social service interventions are fundamental in assisting older individuals to obtain, prepare, and eat appropriate foods. Nutritional assistance needs of homebound minority elders, especially those in rural areas, are largely unknown since they are seldom included in nutritional studies.<sup>148</sup> It has been shown that food insecurity in inner-city homebound minority elders is linked to loss of mobility, poverty, and lack of in-home food assistance.<sup>126</sup> Other relatively new forms of care focusing on the elderly are home health care and hospice care. In 1992, 1.3 million patients were covered by these two forms of services, approximately 13 percent of whom were African American.<sup>149</sup> Specific data on nutritional status and nutritional needs assessment in minority elders using these services are needed.

Data are needed to document the effectiveness of nutritional services at all levels of nutrition support for minority elders. Advancing knowledge and understanding of current programs such as community and in-home long-term care service systems designed to emphasize the well-being of the older minority population should be further developed. Effectiveness of existing programs can be improved by testing new models, systems, and approaches for better provision and delivery of nutritional services to older persons from minority populations. It is also necessary to identify existing barriers to service use by these groups and strategies for overcoming these barriers.

### **Nutrition information and intervention programs**

Nutrition education and counseling for an older individual can play vital roles in helping change his or her eating habits and lifestyle.<sup>150</sup> Though far from being a homogeneous group, older individuals in general encounter similar health, personal, and life cycle factors that form the basis for a common approach to general nutrition education. Many people, not only the elderly and minority groups, are confused about how to select and eat a healthy diet and often harbor misconceptions about the nutritional value of specific foods. Whereas nutrition education is an intervention that a broad range of family members and professionals can use, nutrition counseling leading to dietary changes especially in the elderly requires the expertise of a dietitian or nutritionist.

The major constraint in the development of effective programs for minority elders is the scarcity of data available for different ethnic, religious, and socioeconomic minority groups.<sup>151</sup> Information is needed on food frequency patterns and dietary adaptations of minority elders. In addition, information on factors that affect nutrient availability, such as food preparation methods and food combinations, is necessary to develop effective strategies. Very often a traditional food may be known by many different names, or a single name is applied to a variety of traditional foods, making diet analysis difficult.<sup>152</sup> Therefore information should be developed by a nutritionist or dietitian familiar with the food habits of a particular ethnic group.

The limitations of a conventional and generic nutrition message and counseling tools developed for the U.S. majority are recognized, and it has been shown that assessment accuracy and compliance declines when these methods are applied to minorities.<sup>151</sup> Understanding the influences of living environment on nutrition-related behavior in general does not guarantee the ability to design effective nutrition education strategies for the African American, Hispanic, Asian American, or Native American elderly. To adequately translate factors influencing food consumption and other nutrition-related behaviors among elderly from various minority groups into studies of how best to bring about dietary change, it is necessary to adopt models used in other areas of human behavior. Such models may be derived from social learning, cognitive, behavioral, and other relevant psychological theories and from theories from the fields of communication, marketing, education, and anthropology. To design an effective strategy for dietary change in minority elders we need to identify those communication strategies, instructional methods, counseling techniques, cognitive behavior approaches, patterns of adoption, and diffusion of innovation that are effective in these groups.

Subgroups of the elderly need to be identified and targeted. Beside cultural and ethnic background, gender and age should be considered when developing nutrition education programs. In particular, there are differences in the diet-related problems of "younger" versus "older" elderly that need to be considered. Nutrition education programs for younger, free-living, and physically active or mobile minority elders may include community classes, grocery

tours, food demonstrations, public service announcements, and advertisements promoting healthful eating behaviors. For example, the recently introduced new food labels initiated a multiyear educational campaign. The goal of this campaign is to help consumers make accurate and sound dietary choices in accordance with the Dietary Guidelines for Americans, which offers general nutritional advice without specifying levels of intake. As a result, several programs and educational materials have been developed by the Food and Drug Administration (FDA), the USDA, and other agencies.<sup>152</sup>

Given the many different dietary habits of various minority groups, it would seem appropriate to validate nutrition education programs in specific groups of minority elders from African American, Hispanic, Asian, and Native American populations, among others. Several factors, including age, should be taken under consideration, and if necessary, culturally and ethnically sensitive adaptations should be made at the ethnic group level in order to increase effectiveness of the specific programs delivered at different social settings, including churches, civic agencies, and senior centers.

Similar individualized approaches should be used in preparation of other health-related nutrition education and dietary intervention programs. The elderly, like other adults, already possess a great deal of nutrition information that they may not necessarily put into practice.<sup>153</sup> Interest in maintaining health, opportunities for social interaction and social support, enhanced self-efficacy, good taste, and ease of preparation are motivators that have been shown to be important and can be used in nutrition intervention.<sup>154</sup> Minority elders have a strong sense of autonomy and may make self-determined adjustments in the nutrition message. As a result, they may be unresponsive to suggestions about changes in either cooking or eating habits. Although recommendations for nutritional change may improve the quality of dietary intake, they may at the same time threaten long-established dietary patterns. Therefore it could be difficult to initiate and maintain dietary modifications, and it may be more effective to promote gradual and individualized changes in diets of the elderly than to impose rapid and generic modifications.

For example, an individual dietary plan containing meals prepared with olive or canola oil to replace the use of margarines or pork fat commonly used by Southern African Americans could be more effective than advice to limit intake of saturated fat. Nutrition education strategies may also use models of social or cultural change, especially where the focus is the social structure or the community. Here the goals of nutrition education must be formulated in terms of the specific minority group, and the intervention strategies must address the change process at the group level. The practical application of food and nutrition information is of more interest to the elderly than the nutrition facts. For example, social marketing and communication principles have been used in large-scale studies focused on behavioral changes, including dietary changes in the elderly.<sup>155</sup> Therefore it is necessary to test how well these approaches can be adapted to small-scale eating behavior-modification programs tailored for minority elders at costs and scales of effort that are

affordable and feasible for organizations and local communities. The intervention can also be directed at the social structure itself, for example, changing the food served in community-based senior centers or increasing the availability of nutritionally desirable foods in a community. In addition, nutrition education programs for minority elders with special needs, such as the very frail in whom inadequate nutrition is a problem, diabetic, and other older elderly should also be developed.

Important issues to understand are the nutritional concerns and educational needs of the elderly from different ethnic groups. In general, available evidence suggests that older individuals have a wide range of concerns, from specific topics such as salt, sugar, fat, and cholesterol to broader subjects such as nutritional supplements, food composition, weight control, hypertension, health foods, and pesticides.<sup>156</sup> However, understanding of the specific nutritional concerns of minority elders and of their perceived needs for nutrition information is limited. Therefore surveys should be conducted among elderly from various ethnic groups for the immediate and long-term purpose of guiding the content of the nutrition education message targeted to these groups.

There are several questions related to method, or the combination of methods, that are most effective when delivering nutrition information as a part of treatment or as a disease prevention goal for minority elders. First, an interesting question is whether nutrition information provided at community sites such as churches and senior centers is more effective than information offered in more traditional settings such as health care facilities. Second, it is not clear how many nutrition counseling sessions are typically needed to produce the desired behavior changes in the elderly from various minority groups with one of the nutrition-related diseases or disorders such as hypertension, diabetes, and obesity. Cross-cultural counseling skills are most likely essential for the nutritionist working with elderly from different ethnic backgrounds, and knowledge of culture-based beliefs and heritage may often reveal significant differences in food habits. Respect for cultural values and personal preferences should also be considered as a precondition for a successful health-oriented nutritional promotion in ethnically heterogeneous elderly population.<sup>157</sup> Finally, it is not known whether or not nutrition intervention leads to individual dietary changes that slow the progression of chronic disease and the need for subsequent costly medical intervention. Many of the aspects of preventive health care should be more effective than current efforts to combat established diseases.<sup>158</sup> The cost of implementing dietary change and the research necessary to determine appropriate nutritional strategies for minority elders should be evaluated in terms of treatment cost saved.

Opportunities to improve nutritional message targeted at the elderly from minority groups are numerous. Taking under consideration the complexity of dietary behavior and the potential interactions of the many influencing factors, studies in this area should include integration of several compatible models.

An important goal is to increase the understanding of the existing and potential determinants of dietary change and discover how this knowledge can be used to promote more healthful eating behavior among minority elders.

### **Directions for future research**

Research on nutritional aspects of aging and their impact on minority-related questions requires collaborative investigation because of the multifactorial nature of the problems. Several issues related to nutritional status and nutritional needs of the elderly from minority populations should be on the research agenda. First, improved and specific methods for monitoring and assessing nutritional status and interaction between nutrition, lifestyle, and environment of the elderly from different minority groups are needed to establish a database and appropriate norms. Age-specific nutrient requirements of all elderly are poorly known and should be investigated. Since minority elders for a long time have not been adequately present in studies that draw representative samples of the U.S. population, special emphasis is required in order to describe the nutritional status, the dietary practices, and the association of nutrition with chronic diseases that are present in these groups.

Second, studies are needed on food habits and nutritional values of current diets, both related to ethnic, cultural, and/or religious identity specific to the various minority groups. This approach would define and formulate dietary intervention programs that would modify these traditional diets rather than introduce generic diets, and it would modify food habits rather than promote habits nonspecific to the target group of the minority elders. Third, the role of nutrition in the etiology and pathology of chronic diseases and disorders prevalent among minorities such as obesity, diabetes, some cancers, hypertension, and cardiovascular disease should be elucidated. Level of physical activity among minority elders is mostly unknown and should be investigated. In addition, differences in morbidity and mortality rates among elderly from various ethnic groups should be further investigated. Fourth, gaps in nutrition services for minority elders should be investigated. For example, studies of specific minority groups are necessary to better understand differences in their needs and preferences for nutritional services. Barriers prohibiting use of nutritional services and strategies to overcome these barriers should also be investigated. Likewise, longitudinal studies are needed to monitor whether or not there are any ethnic differences in the prevalence of undernutrition among hospitalized and institutionalized elderly.

Finally, new and innovative educational strategies to promote better nutrition among minority elders should be developed or adapted. These strategies should use more creative and effective ways to reach minority elders, deliver nutrition messages, and, as a result, facilitate necessary dietary changes acceptable to the elderly, taking their ethnic and cultural backgrounds into account.

## Conclusion

Existing studies accurately report increased morbidity and mortality rates in diet-related diseases such as cardiovascular disease, hypertension, obesity, and diabetes mellitus among ethnic minority groups as compared with whites. The highest morbidity and mortality rates are found among African Americans. These differences may be due to socioeconomic, health service access, sociocultural, behavioral, and physiological factors. There has been a gap in the current nutrition monitoring system, and as a result minority elders have not been adequately represented in all national surveys. Therefore minority elders should be sampled in sufficient numbers to permit a comprehensive nutritional and health status assessment of various minority subgroups. There is a need for developing and promoting direct prevention and intervention strategies to enhance the nutritional status of the minority elders living in long-term care facilities or community settings. Nutritionists and health professionals should work together with all levels of government, nonprofit organizations, and the public to find ways to prevent malnutrition and hunger among the elderly from all ethnic and cultural backgrounds. The inclusion of specific nutrition-related objectives for the elderly in health promotion goals should encourage more efforts to prevent disease and disability among minority elders. There is a need for increased sensitivity of nutritionists and dietitians to certain cultural and ethnically related issues such as health beliefs, religious and spiritual orientation, and ethnic diets among the elderly. Special studies are required in order to describe nutritional status, dietary practices, and the association of malnutrition with chronic diseases prevalent in high ratios in minority elders.

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