



New nutrition recommendations for healthy aging

Nove preporuke o ishrani za zdravo starenje

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Introduction

Population aging shows a global rising trend. The World Health Organization (WHO) foresees that 1.2 billion elderly will live on Earth in 2025, two thirds of them in underdeveloped regions¹. Actual studies have confirmed that most prevailing diseases in adults and/or elderly result from inadequate nutrition, that nutritional risk factors influence aged persons falling ill still in their early years and that risks only accumulate in time and affect synergistically the physiological changes in aging²⁻⁴. Also, the WHO experts consider that nutrition risk prevention is a vital investment into the future¹.

Nutrients important for old age

Elderly have special nutritional problems and requirements, in the first place due to involutionary physiological processes but also to metabolic changes synergistically affecting, together with social medical factors and nutritional status⁵. The results of a well-known SENECA study (Survey in Europe on Nutrition and the Elderly, a Concerted Action) showed that nutritional factors qualitatively influence mortality, more than 25%⁶.

This refers especially to energy intake, protein, vitamin D and vitamin B12 intakes. The most recent dietary recommendations for healthy people – DRI (report by the Food and Nutrition Board of the National Academies developed jointly by American and Canadian scientists) gave separately, for the first time, recommended values for adults aged 50 to 70 and those aged over 70⁷.

Excessive energy intake contributes to the greatest extent to obesity; its prevalence is 4 times higher among elderly within the last few decades². Body mass index (BMI) as main obesity indicator increases with aging regardless the

level of physical activity; subsequently, higher BMI values are followed by higher morbidity and mortality rates^{2,8,9}. In elderly, the quantity of visceral adipose tissue represents a disease risk much more important than BMI values. However, it is desirable to monitor BMI values in order to prevent risk and undesirable body mass fluctuations, and permanently maintain BMI values stable even if not within optimal limits (18.5–24.9 kg/m²)^{3,9}.

Assessment of cardiovascular morbidity showed that physical fitness, i.e. “readiness” of cardiovascular system, is essential. An important effect in aged persons’ body mass reduction is achieved by exercise only, regardless a reduction diet^{10,11}. Although dietary treatment contributes to the reduction of visceral adipose tissue, physical exercise improves cardio-respiratory state, reduces overall and intra-abdominal fat tissue, thus increasing muscular strength and endurance; it also reduces insulin resistance¹².

Reduced and insufficient protein intake will result in sarcopenia and even osteopenia appearance in the elderly. Sarcopenia, as an age-related progressive process, occurs already after 30 years of age by 3-8% reduction in skeletal muscle mass every ten years. A comprehensive current research has examined the mechanisms of its occurrence, as well as the prevention possibilities. Latest studies have confirmed that muscular restoration and preservation in elderly depend on qualitative and quantitative protein content in food, as well as appropriate physical activity¹³⁻¹⁵. In order to maintain anabolism in skeletal muscles it is necessary that each meal (of usual three daily meals) contains an adequate quantity of proteins. It is important that anabolic effect is maintained with respect to the content of essential amino acids¹⁶. Daily intake should also adequately provide proteins of animal and plant origin: 60 g of protein daily intake should be divided into three even meals where the content of essential amino acids should be 5–8 g, thus obtaining their

minimum daily intake of 10–15 g necessary for anabolic effect in elderly. There is no effect if protein intake is 10 g through first, 40 g through second and 10 g through third meals. It is very important to know that protein intake exceeding 30 g per meal is undesirable regarding protein synthesis, energy balance, and especially glomerular filtration and renal function disorders. Intake of 20-25 g proteins of high biological value per meal results in 10 g essential amino acids which maximally stimulate protein synthesis in skeletal muscles¹⁷. Intake of essential amino acids can also be obtained by supplements. Leucine intake through adequate protein meals is suggested if there is no insufficiency of renal function. Such combination will potentially contribute to sarcopenia prevention and protein synthesis stimulation to the greatest possible extent^{13,17}.

Mobility of many elderly is limited due to disease or inability. Therefore, regardless the fact that physical activity largely contributes to sarcopenia prevention, protein synthesis in muscles and muscular preservation – adequate protein intake and/or supplementing by essential amino acids remain the only solution.

Protein deficiency in elderly diets increases the risk of osteoporosis, lowers the IGF-1 (insulin-like growth hormone-1) level and reduces bone mass; simultaneously, it stimulates the synthesis of inflammatory cytokines such as TNF- α which increases bone resorption¹⁵. It is therefore considered that supplementing with proteins is useful, since levels of IGF-1 in the serum, albumin, prealbumin and IgM increase, with the probability of bone mass reduction in the proximal part of femur decreases¹⁵. With respect to these considerations an increased daily intake of proteins should be suggested to elderly because of their sarcopenia and osteopenia preventing role, results of large research studies proposed a moderate increase of protein intake: latest recommendations of WHO elderly nutrition expert group are that protein intake should amount 0.9–1.1 g/kg body mass². On the other hand, latest DRI nutrition recommendations do not suggest adults and elderly any increase of protein daily intake which is still 0.8 g/kg body mass⁷. Therefore, it is not necessary for elderly to increase protein intake, but only ensure sufficient daily intake, its quality and uniformity within the three main meals.

A potentially insufficient nutrient intake in elderly is possible for calcium, vitamin D, potassium, vitamin E, vitamin K and dietary fibres. These deficits are explained by the fact that elderly consume less milk and dairy products (which are the best source of calcium) probably because of lactose intolerance syndrome. According to the Centre for Disease Control, liquid milk is also, of all foodstuffs, the most reliable source of vitamin D¹⁸⁻²⁰. Lesser milk consumption, insufficient exposure to Sun, and a reduced level of endogenous vitamin D due to a reduced skin capacity to synthesize it, are reasons for its deficit in elderly population. It is important to underline that obesity contributes to vitamin D deficit, since vitamin D precipitation in adipocytes occurs in obese elderly and its bioavailability thus becomes insufficient. Vitamin D deficit occurs in a average 40% elderly and results in worsening of physical functions

and muscular weakness. Newer dietary recommendations therefore suggest vitamin D daily intakes of 10 and 15 micrograms for persons aged 50 to 70, and over 70, respectively^{18,19}.

New recommendations and their application

A disease in old age can be influenced by nutrition still in early childhood. It seems that diet changes affect the level of risk factors during life. Intake of minimum 1-2 portions daily of fruits and vegetables could reduce the cardiovascular disease risk by around 30%.

In 1999 (International Year of Elderly), the first dietary pyramid for elderly was proposed. It was intended for persons over 70, in order to point out the need to move the previous old age limit of 65 years¹³.

A modified model of elderly dietary pyramid was proposed in January 2008 (Figure 1) that was harmonized with

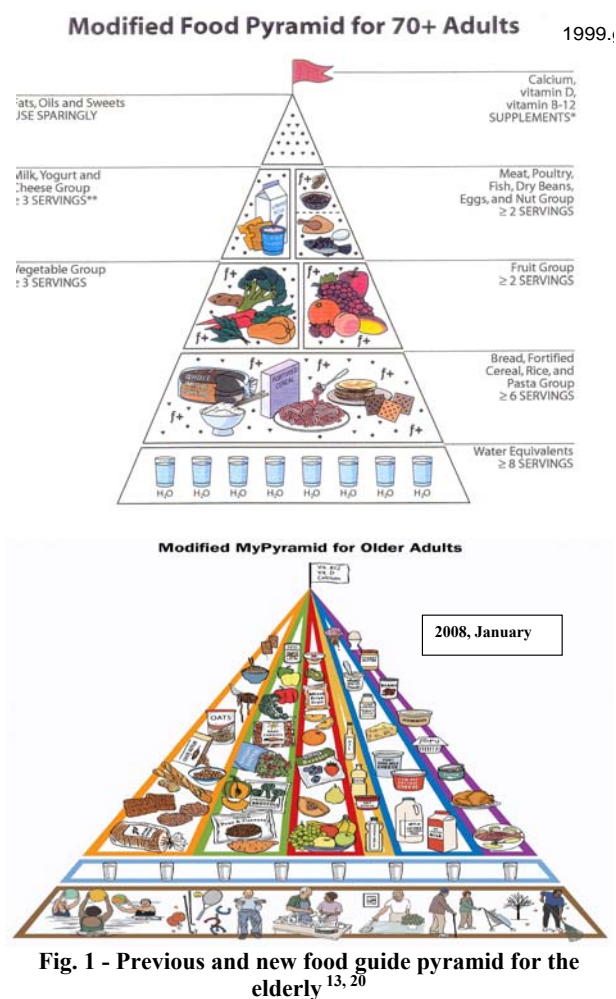


Fig. 1 - Previous and new food guide pyramid for the elderly^{13, 20}

new nutrition recommendations of 2006²⁰. It was designed to represent a proper nutritional guide since it illustrates the importance of individual diet, physical activity and gradual improvement of all lifestyle habits.

This modern pyramid model is oriented towards elderly who live an independent active life and are of relatively good

health. The pyramid's design is a direct presentation of latest dietary recommendations that are not only to provide necessary nutrient intake but also to prevent dietary deficits and chronic non-communicable diseases where nutrition has an etiologic role in elderly.

The pyramid emphasizes the importance of nutritional adequacy, achieved by a proper choice of foodstuffs of greater nutritional density, rich in dietary fibers, with reduced content of total fats, saturated fats and trans-fatty acids, or containing no fats. It shows that diets should contain whole grain cereals and their products, fruit, vegetables, vegetable oils, lactose-free milk, products which are the source of vegetable proteins, as well as enriched and fortified products.

Regular intake of vegetables and fruits fresh, canned or frozen – is suggested to provide sufficient potassium, vitamin E and vitamin K. A required nutritional density and most suitable forms of foodstuffs are thus achieved. The importance of nutrient intake from foodstuffs, not from supplements, also becomes evident; however, supplementing is possible for vitamin B12, vitamin D and calcium (as indicated also in the previous pyramid model). Optimal fluid intake is important for elderly: this recommendation figures in the pyramid's second row.

The pyramid base, suggesting physical activity, is absolutely new. It conforms to recommendations given in 2007 by the Cardiologists Association which integrate preventive and therapeutic programs²¹. These suggest aerobic exercise, muscle strengthening and stretching exercise, as well as balance exercise. It is suggested to elderly to extend a daily duration of chosen activity.

Conclusion

Life duration has almost doubled within the past 200 years. There is a rising trend of elderly population increase, especially those older than 85. However, such increase is not followed by improvement of the quality of life: old age is full of disease. Growing old is successful only if active – it is not sufficient to influence only the nutritional and moribogenic factors, but also to promote regular physical activity of this population. Activities promoting health and preventing chronic non-communicable diseases should be long-term ones. However, lifestyle factors are important also because they exert influence on physical functioning, mental health and well-being. It is never late to correct bad habits when health is concerned. Longer life is possible by an adequately balanced diet.

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