



Eating habits and behaviors of older people: Where are we now and where should we go?



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ABSTRACT

Nutrition is a modifiable factor affecting the quality of life and independence of older people. The physiological, psychological and social changes during aging affect their dietary choices. Many older adults have inadequate energy and protein intake. Carbohydrate intake and intake of total lipids, in terms of contribution to total energy intake, generally are within the recommended levels, but a decline in overall energy intake as well as the limited variety of micronutrient-dense foods that older people tend to consume result in an inadequate intake of several micronutrients. Adherence to healthy dietary patterns has been described as only moderate among older adults. Health-care practitioners should educate older people and promote healthy diets, in particular adequate energy and protein intake.

1. Introduction

The average life expectancy at birth has dramatically increased, from 47 years in the early 1900s to almost 80 years today. By 2050, the global population aged 65 years or over is expected to be more than quadruple that in 2004 (461 million), reaching nearly 2.1 billion [1]. However, the healthy life expectancy, i.e. the average number of years free of disability, does not follow similar trends. While the global average life expectancy in 2015 was 71.4 years for both sexes, the global average healthy life expectancy was 63.1 years [2]. The gap between life expectancy and healthy life expectancy is partially explained by the chronic conditions commonly accompany aging, such as dementia, diabetes and arthritis [3], together with the age-related decline in functional status [4]. In an attempt to bridge the gap between quantity and quality of life, researchers worldwide are exploring the modifiable factors that can prolong the healthy years of later life, a key one of which is nutrition [5].

Nutrition is a major determinant of the quality of life during aging. A multinational pooled analysis of data for the aged population suggested that 28% of men and 21% of women were malnourished, while 49% of women and 46% of men were at risk of malnutrition [6]. A

study in a population of older adults in Canada concluded that a third of the participants were at nutritional risk [7]. These individuals at risk had 20% higher odds of requiring acute hospital care and 60% higher odds of death during a follow-up period of 35–36 months. Similarly, in another study, older individuals at low or moderate nutritional risk reported higher quality of life and less decline over 18 months than those at high nutritional risk [8].

The physiological, psychological and social changes during aging affect the dietary choices of older people [9]. The loss of skeletal muscle mass and the concomitant increase in body fat mass that occur with aging are accompanied by weakness, low physical activity and a lower resting metabolic rate [10]. Moreover, the natural losses of taste and smell may lead to decreased appetite and poor dietary habits [11]. Age-related diseases and polypharmacy often interfere with the ingestion, absorption and metabolism of food; in addition, dental conditions influence the dietary habits of older adults and potentially further compromise their nutritional status [12,13]. Furthermore, eating habits are strongly influenced by social and psychological changes that occur with aging [12]. Low income or poverty together with the need to buy medications can mean that some older persons are financially unable to meet their nutritional needs [14]. Loneliness and the increased

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likelihood of eating alone influence dietary intake, as older adults who eat with other people tend to consume more than those who eat alone [15]. Finally, age-related psychological factors, such as depression, which is extremely common in the older population, are important determinants of energy balance [16].

All these changes and age-related factors have an important impact on the dietary choices and eating behaviors of older people. The aim of the present narrative review is to provide an overview of their dietary habits and changes, to highlight potential inadequacies in diet, and to make suggestions for clinical practice and research. We focus on specific areas of nutrition relevant to older adults, rather than systematically reviewing all available data, and in particular present evidence from systematic reviews and meta-analyses. Dietary patterns were thoroughly explored as an area of interest because they have important clinical implications.

2. Dietary intake in later life

2.1. Energy intake

Most of the evidence indicates that there is a decline in energy intake with age. Wurtman et al. measured food intake in young and old adults living and eating under identical controlled conditions and found that young men and women as a group consumed more calories than the older subjects, both from meals and from snacks, and this difference persisted when caloric intakes were adjusted for differences in body weight [17]. Data from several cross-sectional and longitudinal studies indicate that the average energy intake is lower by 1000–1200 kcal/day in men and 600–800 kcal/day in women between those in their 20s and those in their 80s [18]. In a study where in-depth dietary assessment was used, older adults with a mean age of 77 years were found to consume an average of only 1300 cal per day [15], whereas an observational study of even older people (average age 84 years) showed that 16% of them had very low daily energy intake (< 20 kcal/kg body weight/day) [19]. The decreased energy intake of older adults could be attributed to a number of factors, including impaired appetite connected with aging, changes in physical performance and psycho-social factors [20], as discussed below.

Despite the decline in energy intake, the prevalence of obesity in this age group has increased in recent times, in line with general trends, and it is expected to increase further [21]. Hence, there are some older people in positive energy balance, maybe due to concomitant changes in physical activity levels, as a sedentary lifestyle has become more prevalent, in combination with a decreased resting metabolic rate in older age [22]. However, obesity does decline after the age of 75–80 years [23,24], a finding that may be attributed to further decreases in energy intake, probably induced by chronic disease [25,26].

2.2. Macronutrient intake

Not just total energy but also macronutrient intake plays an important role in aging and longevity [27,28].

2.2.1. Proteins

Because older adults decrease their total food intake, they are expected to consume a suboptimal quantity of protein. Indeed, although the percentage of protein in the total energy intake does not change with age (it is around 14–15%), the absolute intake (grams per day) as well as the grams of intake per body weight decrease [29,30]. The National Health and Nutrition Examination Survey (NHANES) estimated that the inadequacy of protein intake ranges from < 1% to 5% for men aged 51–70 years to 9% to 24% for women aged ≥ 71 years [30]. Furthermore, many older adults avoid consuming animal protein because they find it difficult to chew and swallow, because of the age-related decline in their sense of smell and taste, or because of health concerns about their intake of cholesterol and saturated fat. Animal

sources provide on average 60% of their total protein intake, the greatest part of that being in the dinner meal [30].

An adequate protein intake is important for maintaining muscle strength and preventing muscle wasting in older people [31]. When energy intake from carbohydrate and fat is suboptimal, a greater percentage of protein is used to provide glucose and consequently less is available for muscle synthesis [32]. Even when protein intake is adequate, there are many age-related factors (insulin resistance, impairments in protein digestion and amino acid absorption) that may inhibit muscle protein synthesis [33]. This, in combination with the high muscle protein breakdown rates observed in older people, results in a negative muscle protein balance and has a negative effect on skeletal muscle mass [34]. Thus, older people need increased protein intake to respond to anabolic stimuli [31]. The Population Reference Intake set by the European Food Safety Authority for adults is 0.83 g of protein/kg body weight and is not differentiated between younger and older adults [35]. The adequacy of these recommendations in the elderly has been widely questioned, though. For example, the European Society for Clinical Nutrition and Metabolism has recommended intakes of 1.0–1.2 g/kg body weight per day for optimal muscle function in healthy older people [31]. The timing and the even distribution of protein intake across the daily meals are also important factors for optimal muscle protein synthesis rates [36,37]. Reviews suggest that older people should consume 25–30 g of high-quality protein at each meal in order to achieve the maximum anabolic response [38,39].

2.2.2. Carbohydrates

Absolute carbohydrate intake declines with age along with the reduction in total energy intake, although the relative intake (expressed as a percentage of total energy intake) does not alter [18]. Carbohydrate intake as an absolute value has been calculated in community-dwelling older adults to average 200 g/day [40], and this decreases with increasing age [18,41,42]. Studies of healthy community-dwelling older adults have revealed that only around 50% of their total energy intake comes from carbohydrates [29,43], and two cross-sectional studies in Mediterranean countries (Spain and Greece) reported even lower intakes, of around 40% [44,45]. In addition, a study in China showed that less than one-third of the participants had relative carbohydrate intake meeting recommendations [42]. The reference intake range for carbohydrates is 45–60% of total energy intake [46].

Apart from total carbohydrate intake, fiber intake is also important. The recommended Adequate Intake of total fiber is 25 g/day [46]. The NHANES studies found that adults aged over 60 years consume 16 g of fiber/day, and that the amount decreases with increasing age [47]. In line with this finding, data from 11 European countries indicate that the average daily intake of fiber ranges from 16 to 20 g/day [48]. However, independently of the absolute fiber intake, older adults, especially women, consume a greater amounts of fiber (g fiber/1000 kcal) than younger age groups [49], a finding that reflects increases in fruit and vegetable consumption, as discussed below.

2.2.3. Lipids

The observed decrease in total energy intake during aging is predominantly ascribed to reduced intake of dietary lipids [50]. Data from phase I of NHANES III revealed a gradual decrease in total lipid intake with aging, in terms of absolute intakes (grams per day), although changes in the relative contribution of lipids to total energy intake were less profound [18]. A cross-sectional time series analysis of all national surveys in the US suggested a gradual decrease across time in dietary lipid intake (% of energy) in older adults, despite the fact that total energy intake increased over time [51]. The most recent data from this analysis indicated that dietary lipids account for 34% of the total energy intake in this age group. Data from European countries showed intakes of dietary lipids in the range 27–45% of energy intake [52]. The few studies that have examined changes in dietary lipid intake longitudinally have confirmed the percentages mentioned above. However,

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