

## Dementia Risk and Diet

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### Editorial

The purpose of this editorial is to convey one, often over-looked, message: What you eat over a lifetime affects the risk of dementia. Like other more common conditions like type 2 diabetes and cardiovascular disease, dementia, including Alzheimer's disease, is a chronic and preventable disease. In fact, risk for all of these chronic conditions can be mitigated by up to 80% by adopting four lifestyles habits: Maintain a healthy body weight, avoid tobacco use, engage in regular exercise and limit time watching television, and consume a nutrient-rich diet [1-4].

Sadly, these healthy behaviours aren't practiced and the results are predictable; the public seeks treatments rather than practices prevention. For heart disease and type 2 diabetes, many effective options are available, further pushing lifestyle changes to the back burner. In contrast, no satisfactory dementia treatments exist or are in the pipe line, so the mandate to adopt healthier lifestyles to reduce dementia risk has never been more important [5]. Already, Medicare recipients with dementia cost three times more than other beneficiaries [6]. In addition, most patients with Alzheimer's disease (95%) have a co-morbidly like heart disease or diabetes; the cost to treat them is twice what someone with the same condition without Alzheimer's costs.

Of the four key lifestyles, diet offers the most promise for reducing dementia risk. Most notably, based on a meta-analysis, including 25 unique cohort studies, adhering to a Mediterranean diet is associated with better cognitive performance throughout a life time [7]. This type of diet is predicated on two principles: inclusion of nutrient-rich foods (e.g., vegetables, fruits, legumes, whole grains, seeds and nuts), and exclusion of processed foods (rich in salt, sugar, and saturated and trans fats) [2,8-11]. Alzheimer's disease risk can be reduced by 15% to 40% with this type of diet [12-14]. Admittedly, the Mediterranean diet has other attributes (rich in olive oil, low in red meat and dairy products). These have less of an impact on dementia risk, because other diets (e.g., Healthy Eating Index, DASH diet), which are rich in essential nutrients and lack processed foods, also convey similar benefits [10,14].

The association between marginal essential nutrient deficiencies and cognitive function has gained broad acceptance in the past decades [8]. How nutrient-dense foods affect dementia risk can be best explained by Ames' "triage theory" [15]. He avers that natural selection is known to favour short-term survival at the expense of long-term health. With inadequate consumption of micronutrients over a lifetime, risk increases for cancer, diabetes, heart disease, and neural decay leading to Alzheimer's disease. Essential nutrient requirements are rarely met, and the gap between what is needed and what is consumed widens with aging.

The argument for consuming a diet rich in essential nutrients to prevent dementia is substantiated from studies of individual nutrients or groups of nutrients [8,16].

Anti-oxidants are necessary to protect the brain mitochondria against oxidative damage [8,9]. Such damage impairs neuron function and leads to cognitive impairment. The antioxidants, vitamin C and E, when given at required amounts, reduced risk of Alzheimer's disease by 20% in one study [17]. Other nutrients (B vitamins and omega-3 fatty acids) slow brain atrophy that is commonly seen in cognitive impairment [18]. Homocysteine, a marker of cognitive impairment, can be reduced with folate, vitamins B12 and B6 [8,19]. Finally, neurotransmitter synthesis needs essential amino acids (i.e., tyrosine and tryptophan) and the micronutrients, riboflavin, niacin, folate, vitamins B6, B12, and C [8,20].

Essential nutrient intake is only half of the story in reducing dementia risk. Other substances need to be excluded from diet like added sugar, saturated and trans fats, and excess salt [11]. The fats are hypercholesterolemia and induce insulin resistance. Cholesterol may play a role in beta-amyloid deposition, but doesn't fully explain the deleterious effects of these fats on increasing risk of dementia. Excess salt intake increases blood pressure. Having high blood pressure significantly increases (P=0.004) the risk of impaired memory and cognitive function [21]. Excess sugar and salt consumption leads to obesity, which is associated with a 34% greater risk of dementia [22].

We are in crisis mode. The current Dietary Guidelines for Healthy Americans 2015-2020 present data showing that 75% of the population consumes a nutrient-poor diet with excesses of salt, added sugar, and saturated and trans fats [23]. With this eating pattern, no one is getting the full complement of essential nutrients in an appropriate amount of calories to prevent obesity. Sadly, the high intake of processed foods containing salt, sugar, and saturated and trans fats precludes one from readily getting required essential nutrients.

Today, Alzheimer's disease is the sixth leading cause of death, but these numbers will escalate rapidly in coming years [24]. By 2050, the number of people age 65 and older with Alzheimer's disease may nearly triple, from 5.2 million to a projected 13.8 million [6]. It is time for action on the part of healthcare professionals to convey to their patients the importance of diet and Alzheimer's disease risk. The food industry also needs to step up and create tasty, nutrient-dense foods with lower amounts of salt, sugar, and saturated and trans fats. Otherwise, the outcome will be dire for an aging population and society in general.

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