



Latest Topics Concerning Cognitive Impairment Related with Olive Oil, Fruits, Vegetables and Others

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Abstract

The authors focused on nutritional therapy, including low carbohydrate diets (LCD), calorie restriction (CR), lipids, olive oil, and other dietary studies. Recent topics on cognitive impairment related to olive oil, fruits, vegetables, and other factors were described with perspectives. A reverse relationship was observed between total fruit/vegetable intake and dementia risk in the elderly. In a study of 92,383 cases, an intake of more than 7g/day of olive oil showed a 28% decreased risk of dementia-related death. Dietary patterns may influence cognitive mechanisms. Among 8,692 elderly participants, lower odds ratios (OR) for cognitive impairment were found for a protein-enriched diet (PED) at 0.910 and an anti-inflammatory diet (AID) at 0.789.

Keywords

Olive Oil, Cognitive Impairment, Low Carbohydrate Diet, Japan Public Health Center, National Center for Geriatrics and Gerontology Longitudinal Epidemiology Study on Aging

Abbreviations

LCD: Low Carbohydrate Diet; JPHC: Japan Public Health Center; NILS-LSA: National Center for Geriatrics and Gerontology Longitudinal Epidemiology Study on Aging

Commentary

The authors and collaborators have specialized in diabetes and diet therapy, conducting various research on nutritional treatments such as low carbohydrate diets (LCD), calorie restriction (CR), lipids, olive oil, and other dietary studies [1-3]. Recent topics concerning diet and nutrition treatment are introduced with some perspectives.

In general, fruits and vegetables are rich in antioxidant vitamins such as vitamin C, β -carotene,

and α -carotene. Prospective observational studies evaluating the efficacy of fruit and vegetable consumption on dementia risk are rare, and results have shown inconsistency. In a recent study, Tsukuba University, Japan, reported on the relationship between fruit/vegetable consumption and dementia risk among the Japanese population [4]. This was a follow-up survey of the Japan Public Health Center (JPHC)-based Prospective Study, including 42,643 cases aged 50-79 years. They used a food frequency questionnaire (FFQ) to analyze the amounts of

vitamins from dietary fruit and vegetable consumption. Cognitive impairment was diagnosed based on daily life and disability status for the long-term care insurance system. Consequently, the hazard ratio (HR) for cognitive impairment was calculated, comparing the highest quartile to the lowest quartile. A reverse relationship was observed between total fruit/vegetable intake and dementia risk in both males and females, with multivariate HRs of 0.87 for males and 0.85 for females, showing a significant difference. Furthermore, an inverse correlation was found between the intake of antioxidant vitamins and dementia risk, with HRs of 0.71 for males and 0.76 for females, also showing significant differences. These results suggest a reduced risk of cognitive impairment with the consumption of fruits, vegetables, and vitamin C [4].

The authors have continued basic research, clinical, and diabetic practice in Shikoku Island, one of the four main islands in Japan, known for its olive production due to its warm and mild climate. Olive oil has been evaluated for its beneficial effects on the aging of senescence-accelerated mice [1]. An apparent association between olive oil intake and dementia-related morbidity/mortality was not known until a recent prospective cohort study from Harvard University [5]. This study included 90,000 cases, where participants consumed more than 7g of olive oil daily, though they rarely consumed it before. About a 30% lower risk of dementia-related death was found. Furthermore, daily replacing 5g of mayonnaise with olive oil showed a similar reduction in risk by 14%. This cohort study included 92,000 females from the Nurses' Health Study (NHS) and men from the Health Professionals Follow-Up Study (HPFS). The quality of diet was assessed using the Alternative Healthy Eating Index and the Mediterranean Diet score. An intake of more than 7g/day of olive oil showed a 28% decreased risk of dementia-related death. Similar to mayonnaise, daily margarine intake of 5g showed an 8% reduction (4 to 12%). However, substituting olive oil for butter or other vegetables did not show significant results. These findings suggest the benefit of olive oil for daily consumption recommendations for cardiovascular and cognitive

health.

It has been suggested that adherence to the Japanese diet may be beneficial for health; however, the relationship with the onset of dementia is not well understood. The National Center for Geriatrics and Gerontology examined the relationship between dietary patterns and the onset of dementia in community-dwelling elderly Japanese people, considering the apolipoprotein E (Apo E) genotype [6]. The results showed that adherence to the Japanese diet was associated with a lower risk of developing dementia, suggesting its benefits in prevention. This research was part of the NILS-LSA (National Center for Geriatrics and Gerontology Longitudinal Epidemiology Study on Aging) project, including 1,504 elderly individuals (65-82 years). The median follow-up period was 11.4 years (IQR: 7.8-15.1). During this period, 225 cases (15.0%) of dementia were confirmed. The multivariate-adjusted HR for the age of onset of dementia in the comparison of the T₃/T₁ group was 0.58.

Previous observational research indicated a potential link between dietary salt and dementia. To explore causality, a two-sample Mendelian randomization (MR) was performed [7]. This study examined the relationship between salt intake and the risk of various dementia subtypes, such as Alzheimer's disease (AD), Lewy body dementia (LBD), and Vascular dementia (VaD). Results showed that European ancestry had an elevated risk of overall dementia, with an odds ratio (OR) of 1.542 for genetically predicted higher salt intake. This finding suggests that dietary salt may play an important role in the risk of cognitive problems.

Diet may be one of the most crucial external factors influencing the development of dementia and other mental disorders in the elderly. It is influenced by the metabolic activity of the gut microbiome, including the immune system, nutrient metabolism, and the synthesis of bioactive molecules [8]. Recently, nutritional psychiatry has emerged as an area of clinical research, indicating the link among regular meals, microbial function, and psychological/psychiatric impairment. Various meal patterns have been investigated in detail, such as

Mediterranean, Western, ketogenic, and vegetarian diets, and their relationship with gut microbiota function/composition.

For increased cognitive impairment in the elderly, dietary patterns may have a significant impact on cognitive mechanisms. However, systematic research on protein-enriched diets (PED) or anti-inflammatory diets (AID) and their relationships was lacking. A total of 8,692 cases with a mean age of 83.5 years were analyzed using data from the China Longitudinal Health and Longevity Survey (CLHLS) [9]. Several types were calculated for PED, AID, and scores for cognitive impairment. Higher consumption of PED and AID was associated with lower cognitive impairment, with odds ratios (OR) of 0.910 and 0.789, respectively. Consequently, the usual consumption of PED and AID is recommended for preventing cognitive impairment from nutritional and dietary perspectives.

The relationship between spicy food intake and global cognitive decline in the elderly was investigated. A total of 196 non-demented elderly individuals were studied. A significant relationship was found in three categories: higher degrees of spiciness in food, decreased memory, and global cognition, but not non-memory cognition. Only elderly individuals with low physical activity showed significant results, with a correlation between spiciness and lower memory at -0.254, and spiciness and global scores at -0.222. In contrast, this tendency was not observed in elderly individuals with high physical activity.

In summary, recent reports concerning the relationship between the intake of fruits/vegetables and dementia have been introduced with perspectives. Among them, large studies such as JPHC, NHS, HPFS, and NILS-LSA are included. This article will hopefully serve as a useful reference for nutrition and aging in the future.

Conflict of Interest

The authors have read and approved the final version of the manuscript. The authors have no conflicts of interest to declare.

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