WALNUTS & COGNITIVE HEALTH

RESEARCH SUGGESTS walnut consumption may be associated with improved cognitive function.[1] Nutrients in walnuts, including polyphenols (69.3 ± 16.5 µmol catechin equivalents/g), tocopherols (5.91 mg per 30 g serving) and polyunsaturated fatty acids (14 g per 30 g serving) may play an important role.[2] Additionally, substantial research supports the inclusion of walnuts for cardiovascular health, which has been linked to brain health.

AGE-RELATED COGNITIVE DECLINE

A RANDOMIZED CLINICAL TRIAL found that eating a Mediterranean diet supplemented with olive oil or nuts (primarily walnuts) was correlated with reduced age-related decline in cognitive function in an older Spanish population (ages 55-80) at high cardiovascular risk.[3] This clinical trial was conducted in a subcohort of the PREvención con DIeta MEDiterránea (PREDIMED) trial. Participants (447 total) were randomly assigned to a Mediterranean diet supplemented with either mixed nuts (15g walnuts, 7.5g almonds and 7.5g hazelnuts per day) or extra virgin olive oil (at least 50 grams or 4 tablespoons per day), or a low-fat diet (control group). The study found participants who consumed a Mediterranean diet with nuts, including walnuts, showed improvements in memory compared to a low-fat diet.

RESEARCHERS FROM NYS INSTITUTE FOR BASIC RESEARCH IN DEVELOPMENTAL DISABILITIES demonstrated that a diet including walnuts may have a beneficial effect in reducing the risk, delaying the onset or slowing the progression of Alzheimer's disease in an animal model.[4] Researchers examined the effects of dietary supplementation with six percent or nine percent walnuts in mice (equivalent to 30 grams and 45 gram of walnuts per day in humans) compared to a control diet with no walnuts. The study found significant improvement in learning skills, memory, anxiety reduction and motor development in mice fed a walnut-enriched diet. This research stemmed from a cell culture study that highlighted the protective effects of walnut extract against the oxidative damage caused by amyloid beta protein, the major component of amyloid plaques that form as a result of Alzheimer's disease.[5] Findings from animal and cell studies are provided as background and used to formulate hypotheses for additional research needed to determine the effects on humans.

COGNITIVE FUNCTION & MENTAL HEALTH

ACCORDING TO AN EPIDEMIOLOGICAL STUDY, eating walnuts may improve performance on cognitive function tests for memory, concentration and information processing speed in adults (ages 20-59 and 60 and older).[6] This was seen even after adjusting for age, gender, race, education, BMI, smoking, alcohol consumption and physical activity. Analyses were based on single, 24-hour recalls, which reflect one day of intake. This retrospective cross-sectional study included cognitive data across multiple National Health and Nutrition Examination (NHANES) surveys, representing over 10,000 individuals in the U.S.

ANOTHER EPIDEMIOLOGICAL STUDY suggests consuming walnuts may be associated with lower depression symptoms in American adults.[7] Based on NHANES data, adults (average age 46) who ate walnuts (just under 30 grams per day) were more likely to have greater interest in activities, higher energy levels, less hopelessness (for women), better concentration and greater optimism, compared to those not consuming nuts - even after controlling for age, sex, race, BMI, smoking, alcohol consumption and marital status. This association appeared to be strongest in women, who are more likely to report greater depression symptoms and use of antidepressants.

A STUDY IN NUTRIENTS found that walnut consumption may help improve mood in men.[8] Maintaining their typical diet and lifestyle habits, 64 college-age men and women ate about 60 grams of walnuts daily for eight weeks. Mood was assessed using a common questionnaire (Profiles of Mood States) addressing tension, depression, anger, vigour, fatigue and confusion. Non-depressed healthy, young males (ages 18-25) showed a 27 percent reduction in overall mood disturbances. No significant changes in mood were observed in females or when data included both genders.

WALNUTS & HEALTHY AGING

IN ADDITION TO COGNITIVE HEALTH, maintaining and improving physical function and lowering the risk for chronic diseases are factors that can influence independence and quality of life as people age. Research demonstrated that eating a healthy diet that includes foods like walnuts was associated with reduced likelihood of developing physical impairment in older adults.[9,10] Investigators examined data from 12,658 men from the Health Professionals Follow-Up Study and 54,762 women in the prospective Nurses' Health Study. An overall healthy diet pattern was more strongly associated with better physical function than an individual food. Greater intake of vegetables, legumes and nuts, including walnuts, polyunsaturated fats, and lower intake of red or processed meats and sugar-sweetened beverages each modestly lowered risk of impairment.

ANOTHER STUDY FOUND that women who consumed at least two servings of walnuts per week during their late 50s and early 60s were more likely to age healthfully compared to those who did not eat nuts.[11] In this study, "healthy aging" was defined as having no chronic diseases, reported memory impairment or physical disabilities as well as having intact mental health after the age of 65. Researchers looked at data from 33,931 women in the Nurses' Health Study to evaluate the association between nut consumption and overall health and well-being in aging. After accounting for various factors that could impact health in older adults such as age, education, income, BMI, calorie intake, smoking, physical activity and diet quality, researchers found a significant association between total nut intake (including peanuts, walnuts and other nuts) and higher odds of healthy aging. When looking at the impact of specific types of nuts, only walnuts were associated with significantly better odds of healthy aging.

For epidemiological studies, residual confounding cannot be ruled out (i.e., other lifestyle habits which are more common in adults who eat walnuts could contribute to the study results) and findings cannot prove causality.[6,7,8,9,10,11] More research is needed to clarify how the health benefits apply to other populations, as well as to determine the optimal quantity of walnuts needed to confer associated benefits.[1,6,7,8,9,10] In the context of a Mediterranean diet, it is difficult to define what part of the diet is associated with cognitive health.[1]

[1]Poulose SM, Miller MG, Shukitt-Hale B. Role of walnuts in maintaining brain health with age. *J Nutr.* 2014, 144, 561S. [2]The data for antioxidant capacity of foods generated by test-tube methods cannot be extrapolated to human effects. Clinical trials to test benefits of dietary antioxidants have produced mixed results. [3]Valls-Pedret C, Sala-Vila A, Serra-Mir M, et al. Mediterranean diet and age-related cognitive decline: a randomized clinical trial. *JAMA Intern Med.* 2015, 175, 1094. [4]Muthaiyah B, Essa MM, Lee M, et al. Dietary supplementation of walnuts improves memory deficits and learning skills in transgenic mouse model of Alzheimer's disease. *J Alzheimers Dis.* 2014, 42, 1397. [5]Chauhan N, Wang KC, Wegiel J, et al. Walnut extract inhibits the fibrillization of amyloid beta-protein, and also defibrillizes its preformed fibrils. *Curr Alzheimer Res.* 2004, 1, 183. [6]Arab L, Ang A. A cross sectional study of the association between walnut consumption and cognitive function among adult US populations represented in NHANES. *J Nutr Health Aging.* 2015, 19, 284. [7]Arab L, Guo R, Elashoff D. Lower Depression Scores among Walnut Consumers in NHANES. *Nutrients.* 2019, 11, 275. [8]Pribis P. Effects of Walnut Consumption on Mood in Young Adults – A Randomized Controlled Trial. *Nutrients.* 2016, 8, 668. [9]Hagan KA, Grodstein F. The Alternative Healthy Eating Index and Physical Function Impairment in Men. *J Nutr Health Aging.* 2019, 23, 459. [10]Hagan KA, Chiuve SE, Stampfer MJ, et al. Greater adherence to the alternative healthy eating index is associated with lower incidence of physical function impairment in the nurses' health study. *J Nutr.* 2016, 146, 1341. [11] Freitas-Simoes TM, Wagner M, Samieri C, et al. Consumption of Nuts at Midlife and Healthy Aging in Women [published online ahead of print January 17, 2020] *J Aging Res.*

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