Mediterranean Diet and Age-Related Cognitive Decline

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BACKGROUND
According to the World Health Organization (WHO), there are about 47 million people worldwide living with dementia, with 9.9 million new cases developing annually. Currently, there is no known effective treatment of dementia, and it is important to identify effective measures that can prevent cognitive decline or delay progression of pathological processes leading to dementia.

There is a considerable amount of evidence supporting the notion that dietary habits, particularly a Mediterranean Diet (MedDiet), can slow down age-related cognitive decline and possibly delay onset of dementia.

Health benefits of the Mediterranean Diet can probably be contributed to its components with high content of antioxidants and anti-inflammatory substances such as flavonoids, carotenoids, omega-3 and -6 polyunsaturated fatty acids, vitamins E and B. Specifically, extra virgin olive oil (EVOO) and mixed nuts are rich in phenolic compounds, monounsaturated fats (MUFA), and alpha-linolenic acid, all of which can counteract oxidative stress leading to neurodegeneration in the brain.

METHODS
An exhaustive search was performed using Medline-PubMed, Web of Science, and CINAHL-EBSCO. Keywords included: Mediterranean Diet, cognition, cognitive function decline, and older adult population. Articles that assessed cognitive function through RCTs were selected. Relevant articles were assessed for quality using the GRADE guidelines.

RESULTS
Three studies met the inclusion criteria and were included in this systematic review. All of the included studies were Randomized Control Trials. Two studies examined an effect of the MedDiet, supplemented with either olive oil or nuts, in a group of Mediterranean aging population with increased risk of CV disease. The first study didn’t have a baseline measurement of cognitive function. The second study was a post hoc study of the first and performed cognitive functions measurements to a greater extent at the beginning and the end of the trial. Both of these long-term studies found a statistically significant difference in various aspects of cognitive function. The third study was done on an physically and cognitively healthy Australian aging population. This short-term study used the extensive neuropsychological tests and found no evidence of cognitive improvement in elderly healthy adults after 6 months of being on a MedDiet.

DISCUSSION
All studies presented in this review were randomized, controlled trials that investigated the effects of a Mediterranean Diet on cognitive function in older adult populations. Two of these studies found significant differences in some aspects of cognitive performance among elderly adults with increased risk of CV disease. Their results suggest that a long-term use of a MedDiet is associated with improved cognitive function in older population. On the contrary, the third, short-term study reported null findings among healthy older adults. These three available RCTs provided inconsistent and contradictory results and had major common limitations including one-way blinding, possible recruitment bias, a small sample size, and high attrition bias (Table II). It is difficult to combine and compare data of these studies due to a use of different experimental and control groups from different regions, use of different variations of MedDiet and a control diet, and use of different neuropsychological tests for a cognitive functions assessment (Table II).

Some reports indicate that an effect of a MedDiet on cognitive decline and dementia might be determined by cultural or racial differences. The first two studies were confined to the Mediterranean region and done in a group of aging adults with high risk of CVD, while the Medley study was done among very healthy, well-educated elderly Australian adults. Lack of diversity in population samples make it difficult to arrive to a conclusion regarding applicability of these studies to general elderly population.

Different results of cognitive performance in experimental groups that used different components of the MedDiet (EVOO or Nuts) might indicate their individual affect on various aspects of global cognition. This view is supported by other publications. Future RCTs need to clarify which individuals components of the MedDiet work.

CONCLUSION
The effect of the Mediterranean Diet on cognitive function of the general aging population remains unclear. Although, results of 2 reviewed studies indicate that the Mediterranean Diet supplemented with olive oil or nuts might be beneficial for cognitive function in Mediterranean older adults with increased risk of CVDs, several limitations and inconsistent evidence preclude generalization of these results to average aging adults.

The current evidence obtained from the only one available RCT that investigated an effect of a MedDiet in the healthy aging population did not demonstrate a statistically significant difference in cognitive function of this group. Future RCT performed on a larger, more representative population sample for a longer trial duration, using a consistent choice of MedDiet nutrients and comprehensive neuropsychological battery are necessary.

REFERENCES