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Artículo Original

Omega 3 or Creatine Supplementation in Older Adults and its Impact on Cognitive Function: A Systematic Review

Suplementación con Omega 3 o Creatina en Adultos Mayores y su Impacto en la Función Cognitiva: Una Revisión Sistemática

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ABSTRACT

The systematic review was carried out using the PRISMA methodology and focused on the search for scientific articles in which the effects of omega-3 or creatine supplementation in adults over 60 years of age and its effect on cognitive function had been investigated. The search criteria were supplementation, omega 3, creatine, older adults, memory, function and cognitive impairment. The exclusion criteria were athletes and people under 60 years of age. Articles from PubMed, ScienceDirect and SciELO were included. 223 articles were found investigating the effect of omega-3 supplementation and 25 articles on creatine supplementation, of which 29 and 3 were selected that met the inclusion and exclusion criteria respectively for each group. Concluding that adequate consumption of sources of omega 3 and creatine has a preventive benefit against memory conditions and cognitive deterioration related to aging, since it intervenes in the structure and function of the brain. These findings highlight the importance of a balanced diet and the possible usefulness of supplements in maintaining cognitive health in the older adult population.

Keywords: Cupplementation, creatine, omega 3, older adult, memory, cognitive function and impairment.

RESUMEN

La revisión sistemática se realizó utilizando la metodología PRISMA y se centró en la búsqueda de artículos científicos en los cuales se había investigado los efectos de la suplementación con omega 3 o creatina en adultos mayores de 60 años y su efecto en la función cognitiva. Los criterios de búsqueda fueron suplementación, omega 3, creatina, adultos mayores, memoria, función y deterioro cognitivos. Los criterios de exclusión fueron deportistas y personas menores de 60 años. Se incluyeron artículos de PubMed, ScienceDirect y SciELO. Se encontraron 223 artículos en donde se investigaba el efecto de la suplementación con omega 3 y 25 artículos sobre la suplementación con creatina, de los cuales se se-

leccionaron 29 y 3 que cumplieron con los criterios de inclusión y exclusión respectivamente de cada grupo. Concluyendo que el consumo adecuado de fuentes de omega 3 y creatina tiene un beneficio preventivo contra afecciones en la memoria y el deterioro cognitivo relacionados con el envejecimiento, puesto que, interviene en la estructura y función del cerebro. Estos hallazgos resaltan la importancia de una dieta equilibrada y la posible utilidad de los suplementos en el mantenimiento de la salud cognitiva en la población adulta mayor.
Palabras clave: Suplementación, creatina, omega 3, adulto mayor, memoria, función y deterioro cognitivos.

INTRODUCTION

Currently, non-communicable diseases are the leading cause of death among people over 60 years of age. These chronic diseases are associated with modifiable, metabolic and environmental risk factors. Regarding modifiable risk factors, they include behaviors such as an unhealthy diet, lack of physical activity, tobacco and alcohol consumption, among others (WHO, 2023).

During the aging process, cognitive symptoms appear, such as a decrease in information retention and memory attention (Camargo and Laguado, 2017). Older people aspire to healthy aging and look for options that contribute to healthy aging, such as the consumption of nutritional supplements. These products have gained relevance among the population and are defined as substances that provide nutrients to address or reduce health problems. , although they should never replace a balanced diet. Supplements can come in various forms, such as powders, tablets, gels, liquids, and pills, and may contain vitamins, fiber, minerals, amino acids, enzymes, among others (National Institute on Aging, 2017).

One of the commonly consumed supplements is omega 3, a polyunsaturated fatty acid that plays a crucial role in various brain structures, such as the phospholipid membrane, the myelin sheath, synaptosomes and neurotransmitters. Due to these functions, its consumption could benefit the memory and cognition, especially in individuals with deficient dietary intake of omega 3 (Martínez *et al*., 2018).

In older adults, a decrease in creatine levels in the brain has been observed. Creatine is related to cognitive performance due to its bioenergetic function at the brain level. Therefore, creatine supplementation could be beneficial at this stage of development (Narrea and Ramos, 2022).

This systematic review focused on nutritional supplementation with omega 3 or creatine in older adults and its impact on cognitive function. This topic is relevant due to the biological, psychological and biochemical changes associated with aging, with changes in memory being one of the most notable aspects that can be seen in older adults, although several studies have demonstrated the effectiveness of omega 3 or creatine on memory and cognitive function, few have focused specifically on the effect of this supplementation in older adults.

MATERIALS AND METHODS

The methodology used in this systematic review was based on the Preferred Re-

porting Items for Systematic Reviews and Meta-Analyses (PRISMA), in its most recent version from 2020. The search for the information was obtained through the metasearch engines PubMed, ScienceDirect and SciELO, using the keywords, and "AND" was also used as a Boolean operator. The search equations were written as follows:

1. "supplementation" AND "omega 3" AND "older adult" AND "memory" AND "cognitive function"
2. "supplementation" AND "omega 3" AND "older adult" AND "cognitive function"
3. "supplementation" AND "omega 3" AND "older adult" AND "memory" AND "cognitive function" AND "cognitive impairment"
4. "supplementation" AND "creatine" AND "older adult" AND "memory" AND "cognitive function"
5. "supplementation" AND "creatine" AND "older adult" AND "cognitive function"
6. "supplementation" AND "creatine" AND "older adult" AND "memory" AND "cognitive function" AND "cognitive impairment"
7. "supplementation" AND "creatine" AND "older adult" AND "memory" AND "cognitive function" AND "cognitive impairment"

For the inclusion of studies, the following criteria were considered:

Inclusion criteria:

- Older adults: Studies that included people over 60 years of age were selected, since it is known that memory and cognitive function tend to deteriorate with age. We searched for studies that investigated the effect of supplements on the prevention, delay and improvement of cognitive performance in this age group.
- Creatine or omega 3 supplementation: Studies specifically addressing creatine or omega 3 supplementation in older adults were included.
- Cognitive function, memory and cognitive decline: Studies addressing these topics were included, as the focus was on the use of supplements to improve cognitive function and memory, and delay cognitive decline.
- Indexed journals: Only articles from indexed journals were included, since these have undergone peer review.

Exclusion criteria:

- Athletes: Studies that focused on athletes were excluded, as the use of nutritional supplements is common in this population and could bias the results.
- People under 60 years of age: Studies that included people under 60 years of age were excluded, as they specifically sought to investigate the effect of supplements on older adults.
- Articles published before 2017: All articles published before 2017 were excluded, since a time range from that year to 2024 was established for the search for studies.

RESULTS AND DISCUSSION

Once the search equation was applied for both omega 3 and creatine, the results presented in Table 1 and Table 2 were obtained. In the case of Omega 3, 223 art cles were obtained, of which only 29 were included. in the systematic review. For creatine, a total of 25 investigations were found, of which 3 were included in the systematic re-

view. The databases used contain effective search algorithms and filters that were useful in obtaining research that was in accordance with the inclusion and exclusion criteria.

In addition, the publications identified for both groups were subjected to a second filter, where all those that did not aim to analyze the relationship between omega 3 or creatine supplementation in adults over 60 years of age and its effect on cognitive level were discarded.

Table 1

Article search results for omega

Metasearch engines	Publications identified	Publications selected
PubMed	164	25
SciELO	5	1
ScienceDirect	54	3
Total	**223**	**29**

Table 2

Article search results for creatine

Metasearch engines	Publications identified	Publications selected
PubMed	14	3
SciELO	1	0
ScienceDirect	10	0
Total	**25**	**3**

Only those investigations published between 2017 and 2024 were included in the review (Table 3). In the last 8 years, a growing demand has been evident regarding the consumption of nutritional supplements in the population, for example, for omega 3, the year with the most publications was 2020, which can be attributed to the launch of the program in 2019. "iSupport for Dementia" from the World Health Organization, aimed at caregivers of people with dementia (WHO, 2019), which mentions the use of nutritional supplements that could help improve cognitive function, due to this it increased the interest of researchers in carrying out studies of nutrients that preventively influence neurological conditions. On the other hand, publications on the use of creatine in older adults are scarce, perhaps because its use is more common in sports and in young people.

Table 3

Research published per year

Years	Publications for Omega 3	Publications for creatine
2017	4	0
2018	6	0
2019	3	0
2020	7	0
2021	2	1
2022	4	0
2023	3	2
2024	0	0
Total	**25**	**3**

Omega 3 and brain health

The aging of the world's population has generated increasing interest in understanding the causes of cognitive decline and in finding effective interventions to preserve brain function in older adults. Among the various strategies that are under research, supplementation with omega-3 fatty acids has emerged as a promising line of study. Studies carried out show an overview of the effects of omega-3 supplementation in non-demented older adults, demonstrating that significant benefits can be obtained on the memory of elderly people without dementia, highlighting the accumulated evidence of positive effects in

cognitive function in older adults (Alex *et al*., 2020 and Martí del Moral and Fortique, 2019).

The association between low levels of omega 3 and a higher risk of cognitive decline in older adults has been found, underscoring the relevance of supplementation with omega 3 fatty acids, specifically DHA and EPA, to preserve cognitive function (Coley *et al*., 2018 and Hooper *et al*., 2017). In turn, we can mention that supplementation with fish oil enriched with omega 3 improves oxidative stress and cognitive function in older adults, highlighting the importance of the source of omega 3 used in supplementation and its impact on neurological health. added an interesting perspective by demonstrating a significant association between high plasma levels of omega 3 and an improvement in memory in women and better cognitive processing in elderly men, highlighting the importance of considering gender differences when investigating the effects of supplementation of omega 3 in brain health (Atmadja *et al*., 2020; Duchaine *et al*., 2022 and Kühn *et al*., 2021).

The association of omega 3 and vitamin B can influence cognitive function, in turn the interaction of other nutrients such as homocysteine, achieves an optimal effect on brain health. In addition, they explored the effect of moderate exercise and omega supplementation. 3 on cerebral blood flow in older adults, it was found that omega-3 supplementation in combination with moderate exercise could be beneficial in maintaining adequate cerebral blood flow, which could have positive implications on brain aging (Jernerén *et al*., 2019 and Kaufman *et al*., 2020). Polyunsaturated fatty acids play an important role in reducing oxidative stress and cognitive decline in older adults, providing additional evidence of the cognitive benefits of omega-3 supplementation, highlighting improvements in memory, cognitive function, verbal fluency, and performance. cognitive (Reddan *et al*., 2019; Liu *et al*., 2022; Nolan *et al*., 2018; Ogawa *et al*., 2023 and Patan *et al*., 2021).

The mechanisms behind these beneficial effects, pointing out the importance of DHA and EPA in reducing neuroinflammation, which contributes to better cognition and decreased risk of cognitive decline. cognitive impairment, showing that walnut consumption and omega-3 supplementation can delay cognitive decline and improve brain perfusion in people with mild cognitive impairment (Mora *et al*., 2022; Sala-Vila *et al*., 2020 and Schwarz *et al*., 2018). In addition, transport of polyunsaturated fatty acids across the blood-brain barrier has been demonstrated, highlighting the importance of maintaining adequate levels of these nutrients to prevent cognitive decline (Semba, 2020).

The studies carried out highlight the importance of omega-3 consumption as a preventive measure, pointing out that omega-3 consumption is associated with a lower risk of cognitive impairment, highlighting its impact on synaptic plasticity, the decrease in neuroinflammation and genetic changes. associated with cognitive decline, showing that it can significantly improve cognitive function and delay hippocampal atrophy in older adults with mild cognitive impairment, especially in people with Alzheimer's disease and who have low levels of DHA in the brain, suggesting that supplementation long-term with omega 3 may reduce the risk of cognitive decline and Alzheimer's disease, although the results on the improve-

ment of Alzheimer's are mixed, the importance of considering factors such as intervention time, dose and tests used when interpreting is highlighted. the results (Troesch *et al*., 2020; Wei *et al*., 2023; Welty, 2023; Wood *et al*., 2022; Zavala, 2020 and Zhang *et al*., 2017).

Finally, the use of omega 3 is widespread in the population, however, it is necessary that a greater number of clinical trials be carried out to fully understand the mechanisms and long-term effects of the use of this supplement (Knöchel *et al*., 2017).

Creatine and brain health

Regarding the use of creatine, in older adults it is proposed that it has a crucial role in the bioenergetics of the brain, since it increases the levels of phosphocreatine and ATP. It was also observed that a greater intake of creatine was positively related to visuospatial memory. short-term in older adults, which was demonstrated by higher scores in the forward and reverse Corsi block test, which evaluates short-term visuospatial memory. In addition, magnetic resonance imaging was performed on patients who consumed creatine, demonstrating a significant increase in levels. of creatine in the brain and muscle, which is associated with cognitive improvement in older adults (Oliveira *et al*., 2023; Prokopidis *et al*., 2023 and Seper *et al*., 2021).

CONCLUSIONS

Regarding Omega 3, a consensus has been reached on the potential benefits of supplementation and its effect on cognitive function, especially in older adults and people with mild cognitive impairment. These findings support the idea that polyunsaturated fatty acids, such as DHA and EPA play a crucial role in brain health and may be important in preventing or delaying cognitive decline. There is scientific evidence which indicates that creatine plays a fundamental role in the brain and supplementation is beneficial for cognitive function, this is because it offers the energy that the brain needs for proper functioning. Adequate consumption of sources of omega 3 and creatine has a preventive benefit against memory conditions and cognitive deterioration related to aging, since it intervenes in the structure and function of the brain. These findings highlight the importance of a balanced diet and the possible usefulness of supplements in maintaining cognitive health in the older adult population.

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