

Antioxidants for Patients with Fibromyalgia

Subjects: **Others**

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Fibromyalgia (FM) is a syndrome characterized by chronic widespread pain. Pain is the predominant symptom; allodynia and hyperalgesia are also frequent. These patients also present severe fatigue, impaired cognition, and sleep disturbance, among others. In recent years, antioxidant supplements have become popular to counteract the effects of oxidative stress in fibromyalgia and one of its most distressing symptoms, pain.

antioxidants

fibromyalgia

pain

supplementation

1. Introduction

Although oxidative stress is thought to play an important role in the pathogenesis of Fibromyalgia (FM), further studies are needed ^[1]. One of the ways to counteract the excess of free radicals is to resort to certain nutrients, such as antioxidants. The higher the level of antioxidants in human body, the more protected humans are against oxidative damage. In people with FM, a decrease in antioxidant levels can increase pain ^[2].

Therefore, antioxidants such as vitamins, coenzyme Q10, virgin olive oil, and alpha-lipoic acid (ALA) are of interest due to their association with the characteristic symptoms of FM, one of the main symptoms being pain ^{[3][4][5][6][7]}. Other mineral supplements, such as magnesium or iron, could be used as a co-treatment in this disease, helping to counteract the level of pain and improve quality of life ^[8]. This is because FM patients with reduced magnesium levels are related to low-grade swelling, muscle weakness, and paresthesia, all of which are common symptoms of FM ^[9]. In the case of iron, depletion leads to reduced production of biogenic amines ^[10]. The beneficial effects of vitamin D, as an antioxidant, on pain and its possible association with FM have already been highlighted in a previous review ^[11], although the researchers note that there is no consensus on the association between vitamin D and FM specifically. However, a correlation between low vitamin D status and non-specific musculoskeletal pain has been demonstrated ^[12].

2. Current Insights

This research summarizes the possible relationship between FM and antioxidant supplements and their relationship to possible effects on pain reduction. Pain is one of the conditions that can influence and alter oxidative stress. For example, a disequilibrium between pro-oxidants and antioxidants in people with fibromyalgia and persistent pain suggests that there may be an influence on nociceptive processing. ^{[13][14]}.

A total of 17 studies analyzed specifically assessed the pain symptom using one of the eight scales used for pain in the different trials. Perception of pain as scored on the scales improved significantly after consumption of some antioxidants, as discussed in the previous section. The most commonly used scales for measuring pain perception were VAS (76.47%) and FIQ (47.05%). The research of bibliography has shown that the implication of antioxidants supplements is not without controversy, although clinical trials with CoQ10 and alpha-lipoic acid (ALA) show promising results [8][15], according to this research. In the present discussion, the researchers present each of the antioxidants reviewed in the trials under study and discuss their benefits and possible controversies and evidence.

Alpha-Lipoic Acid (ALA) and Acetyl-L-Carnitine (LAC)

There is strong evidence that ALA and LAC are effective for peripheral neuropathy, especially in diabetics [7][16]. They not only cut down pain but also improve numbness and tingling. There is evidence to suggest possible benefits in reducing the frequency and severity of migraines and pain associated with fibromyalgia. However, this evidence needs further support [17]. In the study by Gilron, et al. (2021) [7] there is no evidence of a significant effect to demonstrate this, so the researchers will have to wait for further studies to definitively prove this or not. One aspect observed in this research related to this type of antioxidant is the need for more RCTs that can confirm sufficient benefits in practical application and be extrapolated to a larger number of patients worldwide.

However, in this entry the researchers have shown that ALA is beneficial in reducing pain perception in FM. Compared with placebo, VAS scores improved significantly after ALA supplementation ($p < 0.05$) [18], although the researchers could not find specific scores.

Coenzyme Q10

Ubiquinone plays a key role in oxidative phosphorylation. Coenzyme Q10 has been shown to beneficially stimulate the AMPK gene, which may be responsible for the inflammation, low antioxidant levels, and low mitochondrial production that characterize the pathophysiology of fibromyalgia [19]. This research shows that there are studies demonstrating its benefits for pain [20][21][22]. The pathophysiology of FM may be influenced by oxidative stress by detecting reduced levels of coenzyme Q10 in blood mononuclear cells derived from FM patients [23]. The study by Miyamae, et al. (2013) [24] showed that CoQ10 levels are reduced in these patients, but that supplementation can restore levels and reduce fibromyalgia symptoms, including pain. However, it did not meet the inclusion criteria of the research here, as it was conducted in children.

Importantly, supplementation with CoQ10 and pregabalin provides additional benefit in relieving pain sensation in patients with FM [20]. In addition, the study by Pierro, et al. (2016) [21] also confirms the beneficial effects of CoQ10 in counteracting pain in women affected by fibromyalgia. It shows that, compared with a control group, CoQ10 administration significantly improved most pain-related outcomes by 24–37%. However, it does not have sufficient statistical evidence due to the limitation pointed out by the authors themselves on the limited number of participants. Overall, Q10 supplementation in the three studies [20][21][22] included in this research did not differ greatly in terms of the amount of CoQ10 300–400 mg/day administered. However, in terms of administration time,

one of them [21] doubled the administration time compared with the other two. In addition to the need for a larger number of participants, the researchers also highlight the need for a longer CoQ10 administration time for comparison.

Vitamins

Randomized placebo-controlled trials can show the therapeutic role of vitamin C, acerola root, and freeze-dried royal jelly [25], and vitamin E, vitamin C and Nigella Sativa [26]. Both studies showed benefits in decreasing pain perception after supplementation; however, on different measurement scales. Pain perception showed a decrease in pain perception with the VAS-Pain scale in the study by Iqbal, et al. ($p < 0.05$) [27] and with the FIQ scale in the study by Bermarki, et al. [25].

This research compared both the efficacy and safety of a supplement called FibromyalgineR (Fib) (vitamin C, acerola root, and freeze-dried royal jelly) with that of another food supplement (FS) (acting as a placebo) and with a control arm that received no supplement. The Fib vitamin supplement resulted in a significant improvement ($p < 0.001$) relative to the other two study groups on the FIQ scale only. It is important to note that the FIQ scale only measures pain intensity on item five, and the VAS scale is specific to pain only; the researchers cannot claim a significant reduction by this supplement in overall pain rating, although it does improve pain intensity. However, another study has also been reported that showed a decrease in VAS pain in FM patients treated with an improved diet and vitamin supplementation in an open-label, non-randomized controlled study [28]. These results confirm existing evidence that supplementation with antioxidants such as vitamins C and E to therapy may be helpful in treating FM symptoms. Ginger, which is a potent antioxidant, may also act on fatigue and pain by decreasing oxidative stress [29].

In addition, vitamins such as vitamin C have analgesic effects on pain as demonstrated by clinical trials. [30].

Other Types of Antioxidants

Other types of antioxidants used in different trials analyzed showed neutral effects on the reduction of pain perception in FM patients. These antioxidants were turmeric supplementation [31], EVOO [32], caffeine [33], creatine monohydrate [34], soy protein with soy isoflavone [35], cherry juice [36], and malic acid with magnesium hydroxide [37]. However, the researchers note that in the study by Bagis, et al. [27], combining magnesium citrate with amitriptyline did show beneficial effects in reducing pain perception using the same VAS pain scale. Magnesium citrate supplementation in combination with amitriptyline was effective in reducing pain, intensity, and other fibromyalgia-related parameters. However, uncombined magnesium citrate only had an effect on pain points. [27]. These are important data for future studies.

Among these antioxidants, the researchers focus specifically on two due to their extensive use in food and in different studies. These are extra virgin olive oil (EVOO) and turmeric. The effects of olive oil intake on cardiovascular disease [38] and rheumatoid arthritis [39] have been beneficial. Both coincide in being diseases with

an association with oxidative stress. However, few studies are available that measure the effect of this type of antioxidant in women with FM in relation to pain [32].

The antioxidant activity of EVOO is responsible for the protection of DNA, proteins, and lipids against ROS, and it is in FM that several studies found elevated levels of ROS [8][32]. The clinical trial reviewed in this research investigated the effect of 50 mL/day EVOO compared to refined olive oil in 23 female subjects with FM. Comparing extra virgin olive oil with refined olive oil after 21 days of intervention, one study showed that protein charring and lipid peroxidation were significantly improved. However, there was no improvement in the pain variable [32]. Therefore, although its efficacy on pain is promising, more studies with this type of antioxidant are needed.

The other antioxidant widely used in everyday life as a spice is turmeric. Turmeric is a spice that has antioxidant, anti-inflammatory, antiviral, and antifungal properties [40]. The effects of a turmeric-based supplement in women with fibromyalgia have not shown a beneficial effect on scales of perceived degree of chronic pain in FM patients [31].

Finally, the researchers conclude that more scientific evidence is needed to show whether turmeric could actually improve chronic pain in FM. Several human studies have found some evidence for the anti-inflammatory activity of curcumin [40]. However, no statistically significant benefit in reducing perceived pain in FM patients has been demonstrated, although it may be recommended for its general anti-inflammatory benefits [41][42].

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