



OMEGA-3 FATTY ACIDS AND DEPRESSION

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ABSTRACT

Effectiveness of Omega-3 Fatty Acids in Depression

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INTRODUCTION

Major depression and bipolar disorder are serious illnesses that combined may afflict as many as 10 to 15% of the population. These disorders are associated with substantial costs to individuals, their families and society through suicide, lost productivity, and elevated rates of service utilization. Depression and bipolar disorder have been ranked first and sixth as worldwide causes of disability adjusted life years (DALYs) among people ages 15 to 44.¹ Despite advances in psychotherapies, pharmacotherapy and other biological approaches, the treatments for these elusive illnesses continue to hit multiple stumbling blocks. With efficacy, frequent side effects, and poor adherence affecting many patients, the need for novel pharmacological approaches to the treatment of these debilitating illnesses is a priority area for research.

Present medication regimens for depression have limited efficacy. As a class, the Serotonin Selective Reuptake Inhibitors (SSRI's) are the most widely prescribed, yet reduce depressive symptoms by 50% in less than half of patients who start them, and by less than 60% of those who complete a full course.² Other antidepressants, such as the tricyclic antidepressants and norepinephrine reuptake inhibitors have similar overall efficacy. It has also been demonstrated that in clinical trials, close to 30% of patients will stop treatment, due to limited efficacy, troublesome side effects, or a combination of both.

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While most medical research focuses on pharmacological treatment, there is a growing body of evidence that nutrition in general, and omega-3 fatty acids in particular may be of great benefit to numerous people.

Omega-3 Fatty Acids

The human body can make most of the types of fats it needs from other fats or raw materials. That isn't the case for omega-3 fatty acids (also called omega-3 fats and n-3 fats). These are *essential* fats-the body can't make them from scratch but must get them from food.

Omega-3 fats are a key family of polyunsaturated fats. There are three main omega-3s:

- Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) come mainly from fish, so they are sometimes called marine omega-3s.
- Alpha-linolenic acid (ALA), is an essential fatty acid, meaning that body can't make it, so get it from the foods and beverages consumed. The human body generally uses ALA for energy, and conversion into EPA and DHA is very limited. Therefore, getting EPA and DHA from foods (and dietary supplements if you take them) is the only practical way to increase levels of these omega-3 fatty acids in the body.³

Sources of Omega-3 Fatty Acids

Omega-3s are found naturally in some foods and are added to some fortified foods.

- Fish and other seafood (especially cold-water fatty fish, such as salmon, mackerel, tuna, herring, and sardines)

- Nuts and seeds (such as flaxseed, chia seeds, and black walnuts)
- Plant oils (such as flaxseed oil, soybean oil, and canola oil)
- Fortified foods (such as certain brands of eggs, yogurt, juices, milk, soy beverages, and infant formulas)
- Omega-3 dietary supplements (fish oil, krill oil, cod liver oil, and algal oil).

Recommended Amount of Alpha-Linolenic Acid (ALA)

Experts have not established recommended amounts for omega-3 fatty acids, except for ALA. Average daily recommended amounts for ALA are listed below in grams (g). The amount you need depends on your age and sex.⁴

Table No 1 Recommended Amount of Alpha-Linolenic Acid (ALA)

Life Stage	Recommended Amount of ALA
Birth to 12 months*	0.5 g
Children 1-3 years	0.7 g
Children 4-8 years	0.9 g
Boys 9-13 years	1.2 g
Girls 9-13 years	1.0 g
Teen boys 14-18 years	1.6 g
Teen girls 14-18 years	1.1 g
Men	1.6 g
Women	1.1 g
Pregnant teens and women	1.4 g
Breastfeeding teens and women	1.3 g

Mechanisms of Omega-3 Fatty Acids

Omega-3 fatty acids may have preventive and therapeutic effects on depression, the underlying mechanisms are still unclear. The pathophysiology of depression has been dominated by the monoamine hypothesis, suggesting that an imbalance, mainly in serotonergic and noradrenergic neurotransmission, is at the core of the pathophysiology of depression.

An effect of omega-3 intake suggested to positively influence the depressive status is the potential interaction with the serotonergic and dopaminergic transmission, including metabolism, release, uptake, and receptor function. Omega-3 Fatty acids are synthesized by dietary shorter-chained omega-3 fatty acid alpha-linolenic acid (ALA) to form the more important long-chain omega-3 fatty acids: eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). The highly unsaturated nature of EPA and DHA provides them with the quality of highly influencing membrane order (namely the fluidity) of several types of cells⁵. Omega-3 Fatty acids also regulate the signal transduction by enhancing G-protein-mediated signal transduction, membrane-bound enzymes, and protein kinase C.⁶ The membrane changing induced by omega-3 Fatty acids intake may affect different neurotransmitter system altering the regulation of dopaminergic and serotonergic neurotransmission, which are dysfunctional in depressed patients.

Omega-3 Fatty Acids Status in Depression

Peoples with high consumption of omega-3 fatty acids, have lower rates of bipolar and unipolar depression, post-partum depression, and seasonal affective disorder. Studies do not prove that low levels of dietary omega-3 fatty acids cause

depression. There are other differences of life style that may also play a role.

Studies of omega-3 fatty acids status in psychiatric patients have shown that depressed patients have lower levels of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).⁷ This connection has been demonstrated in mild depression, major depression, seasonal depression, post-partum depression, and in suicide.

Effects of Omega-3 Fatty Acids in Numerous Psychiatric Conditions

- Bipolar depression Unipolar depression, Depression during pregnancy
- Insomnia and Obstructive sleep apnea
- Anxiety
- Anorexia nervosa
- Depression associated with borderline personality disorder
- Post-partum depression
- Reduction of suicidal thoughts
- Attention deficit hyperactivity disorder (ADHD)
- Behavioural disorder like inattention, hyperactivity and impulsivity
- Reduce the frequency of mood swings
- Relapses in people with both schizophrenia and bipolar disorder
- Decrease violent behaviour
- Help prevent age-related mental decline or dementia and Alzheimer's disease.

Clinical Evidence

Reviewing three studies of omega-3 fatty acids in the treatment of depression that were carried out by our research group at the Beer Sheva Mental Health Center. The first study examined eicosapentaenoic acid (EPA) versus placebo as an adjunct to antidepressant treatment in 20 unipolar patients with recurrent major depression. The second study used omega-3 fatty acids in childhood major depression; 28 children aged 6-12 were randomized to omega-3 fatty acids or placebo as pharmacologic monotherapy. The third study was an open-label add-on trial of EPA in bipolar depression. Twelve bipolar outpatients with depressive symptoms were treated with 1.5-2.0 g/day of EPA for up to 6 months. In the adult unipolar depression study, highly significant benefits were found by week 3 of EPA treatment compared with placebo. In the child study, an analysis of variance (ANOVA) showed highly significant effects of omega-3 on each of the three rating scales. In the bipolar depression study, 8 of the 10 patients who completed at least 1 month of follow-up achieved a 50% or greater reduction in Hamilton depression (Ham-D) scores within 1 month.⁸ No significant side effects were reported in any of the studies. Omega-3 fatty acids were shown to be more effective than placebo for depression in both adults and children in small controlled studies and in an open study of bipolar depression.

CONCLUSION

Laboratory and clinical evidence to suggest that omega-3 fatty acids may play a role in certain cases of depression. Fish oil supplements are well tolerated, and have been shown to be without significant side effects over large scale. Generally, omega-3 supplements are inexpensive, which makes them an

attractive option as an adjuvant to standard care. All mental health professionals should at least ensure adequate intake of omega-3 fatty acids among patients with depression.

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