

A Complex Connection: How The Food You Eat May Influence Mood And Depression



There is evidence that **depression**, **ranging from mild to major depressive disorder**, or MDD, may be influenced by a person's diet — and vice versa. MDD is associated with **chronic diseases** such as heart disease, arthritis and diabetes, as well as high risk of disability and suicide.

Depressive symptoms can include lack of motivation, **fatigue**, feelings of overwhelm and **worthlessness** or guilt, sadness or **abnormal negative mood**, **the inability to feel pleasure**, problems sleeping or sleeping too much and negative self-cognition. Depression is commonly treated with antidepressant medications and/or psychotherapy, though research shows physical activity and social support also can be helpful.

Depression has many potential causes including biochemical factors, such as neurotransmitter activity and the gut microbiome, genetics, social and environmental factors, and even personality. A complex condition, depression likely **stems from** multiple origins.

Research on Diet Quality and Depression

While **a poor diet** may be associated with risk of depression, studies are still assessing whether quality of diet causes depression or **worsens** existing symptoms. Dietary patterns that have been examined and are thought to influence risk of depression include those high in ultra-processed foods, **saturated fat** (including high-fat dairy or fried foods), processed meat, refined grains and added sugars including sugar-sweetened beverages.

In a study of 139 children and adolescents with MDD, researchers found those with MDD reported eating fewer **healthful foods** than those without MDD. The authors inferred that it's possible MDD leads to a less healthful diet, but also that less healthful dietary behaviors may lead to more depressive symptoms.

Other studies have shown that dietary patterns with high consumption of less processed foods including fruits, vegetables, whole grains, legumes, nuts, seeds and fish are inversely associated with risk of depression. Eating patterns including vegetarian and vegan, Mediterranean, traditional Japanese and Nordic diet have been studied, with positive outcomes. An analysis of 4,349 adults' self-reported health and 24-hour food recall data from the Korea National Health and Nutrition Examination Survey found reduced depression rates with increased consumption of fruits and vegetables. A review of 12,062 Taiwanese Buddhists found participants who followed a vegetarian dietary pattern had lower incidence of depressive disorders than non-vegetarians; however, contradictory findings also have been observed.

Researchers suspect the benefits of a healthful diet relative to depression risk could be attributed to factors including improvements in vascular health, lower levels of LDL cholesterol, lower inflammatory levels, less oxidative stress, improvements in neurotransmitters serotonin and norepinephrine or improvements in the gut microbiome.

Dietary Intervention

Preliminary research shows dietary intervention by a registered dietitian nutritionist may be helpful for people with depression. A 12-week randomized controlled trial of dietary improvement for 67 adults with major depression — which included either seven 60-minute sessions by a clinical RDN or social support in addition to dietary changes based on a modified Mediterranean diet model — found those who received dietary education support from an RDN **experienced significantly greater improvement in** depressive symptoms than the control group.

In this study, the dietary intervention pattern included whole grains, vegetables, fruit, legumes, low-fat unsweetened dairy products, raw unsalted nuts, fish and moderate lean red meat, chicken, eggs and olive oil. Additionally, participants were instructed to eat according to their **hunger** and to **reduce consumption of refined cereal, fried food, fast food, processed meat and sugar-sweetened beverages**. They also were instructed not to have more than two alcoholic drinks per day and, if they did drink alcohol, it should be red wine and consumed with meals. For those who completed the trial, more than 32% (10 participants) achieved remission of symptoms, compared to 8% (2 participants) in the control group.

Food Insecurity and Depressive Symptoms

Food insecurity can lead to inadequate intake of nutrients, which can affect mental health and depression and increase risk for **chronic disease**, especially among women in the United States. Studies also show that food access issues are linked to depression. One cross-sectional study of 372 older adults found those with food insecurity had less ability to care for themselves and, **in turn**, had higher depressive symptoms, as well as poorer diets.

Exploring Individual Nutrients

Although specific nutrients have been studied as treatment for MDD, research findings have been mixed and inconclusive. Some research suggests consuming more of certain nutrients such as B vitamins, magnesium, vitamin D, zinc and omega-3 fatty acids may help reduce depressive symptoms. However, research isn't yet clear on whether individual nutrients may be able to reduce risk of depression or improve symptoms in people experiencing depression or anxiety. Most studies indicate that more research is needed.

B vitamins

A systematic review and meta-analysis of B-vitamin supplementation and its effects on depressive symptoms, anxiety and stress found that, while there may be **a potential benefit** to mood in people reporting high levels of stress, it was not beneficial for healthy people or those at risk of mood disorders. Researchers concluded that supplementation may benefit those who are at risk because of either poor nutrient status or stress. A large cross-sectional, population-based study using validated surveys to assess dietary intake of B vitamins and psychological health in Iranian adults found a beneficial effect from a higher intake of biotin and lower odds of anxiety, depression and stress, after adjusting for several confounding factors. An inverse relationship also was observed with vitamin B₆ and the risk of stress. While the results were promising and suggested other B vitamins also may have an influence, researchers stated randomized, controlled trials are needed for further study.

Omega-3s

Omega-3 fatty acids have been shown to upregulate neurogenesis, the process of new neuron development in adults, which can have a protective effect. An inverse relationship has been noted between eating more fish and lower risk of depression. Some studies have shown improvements in depressive symptoms with

omega-3 fatty acid supplements, especially when used with antidepressant medications; other studies have found that any benefit may be small and not clinically significant. Natural Medicines database by TRC Healthcare lists eicosapentaenoic acid, or EPA, supplementation as possibly effective for those with MDD. However, it states that docosahexaenoic acid, or DHA, **does not appear to** improve any type of depression. In studies, 1 to 6 grams of omega-3 fatty acids EPA and DHA per day have been used, but the duration has **varied from** several weeks to months.

Vitamin D

Evidence suggests **adequate** vitamin D intake may help protect the brain from experiencing low dopamine and serotonin levels, which is why correcting vitamin D deficiency may be beneficial for those diagnosed with depression. While there is some evidence of an association between low levels of vitamin D and depression, the National Institutes of Health explains that results of vitamin D and depression research are based on observational studies rather than clinical trials — like many studies on diet as it relates to depression. The Natural Medicines database indicates there is insufficient evidence to rate vitamin D's effectiveness in treating depression and that it doesn't seem to help with prevention.

Zinc

Especially when combined with antidepressant medications, zinc supplementation has shown potential to be helpful, but more research is needed to better understand why. Higher consumption of zinc has been associated with a 28% lower risk of depression, and researchers indicate that it shows promise as an adjunct therapy. Studies have used 7 to 25 milligrams of zinc supplements daily for up to 12 weeks.

In general, while some of these nutrients show potential benefits, research findings are very mixed, and many benefits are seen when used with antidepressant medications.

Dietary Supplements and Herbals

In February, the U.S. Food and Drug Administration warned of 10 companies **illegally selling** dietary supplements that claimed to treat depression and other mental health disorders. The warning states that any dietary supplements that claim to cure, treat, prevent or **mitigate depression** are considered unapproved new drugs and are **potentially harmful**.

In studies, some **herbal supplements** have demonstrated positive effects on depressive symptoms, but each case has considerations ranging from lack of conclusive evidence to drug-nutrient interactions that should be taken seriously.

When compared to a placebo, St. John's wort extract has shown positive effects on mood, reduced insomnia related to depression and decreased anxiety symptoms. Although clinical guidelines from the American College of Physicians and NIH both note that St. John's wort can be equally effective — and better tolerated — as some antidepressant medications in the treatment of mild to moderate depression, there are many challenges and considerations. These include assessing standardization of supplement dosing and significant, even life-threatening, drug-nutrient interactions such as

Considerations for Medication Interactions with Food or Dietary Supplements

According to NHANES data and based on medical **expenditures for** antidepressant and antipsychotic medications, **the use of** medication for depression in the U.S. has been increasing. Antipsychotics and lithium are common treatments that have important dietary considerations.

Side effects of antidepressants can include gastrointestinal symptoms such as nausea; **weight gain** and **increased appetite**; sexual problems and decreased sexual desire; **fatigue and low energy**; or **sleep disturbances** including increased sleepiness or **insomnia**.

potentially major interactions with antidepressants, contraceptive drugs, certain immunosuppressant medications and moderate interactions with cytochrome P450 substrates.

A class of herbs used to help the body adjust to physical and psychological stressors, adaptogens such as rhodiola, saffron and ginseng, among others, have been studied in the treatment and management of depression. Studies show that adaptogens may help improve sleep, including insomnia; balance and decrease the release of stress hormones including cortisol; and lessen symptoms of mild to moderate depression. However, given the wide range of types of adaptogenic herbs, limited studies and potential for drug-nutrient interactions, RDNs should use caution with advising the use of adaptogenic herbs and should work with the patient's or client's health care team to assess whether adaptogens could be used as adjunctive therapy.

Sleep, Stress Reduction and Physical Activity

While nutrition may play a role in the prevention and treatment of depression, some lifestyle factors also can make a difference. Some studies show a connection between sleep and depression, especially with insomnia. Depression disorders are associated with both reduced sleep duration and quality.

One of the most consistent findings about depression is that stressful life events can predict its onset. The ways in which people think about or process stress, how they regulate their emotional response to stress and how their bodies physically respond to stress can make a difference in whether a person will become depressed and how severely.

Studies show a benefit from stress reduction techniques, specifically mindfulness-based stress reduction, or MBSR. This eight-week program utilizes mindfulness meditation and other strategies that have led to significant reductions in depressive symptoms in several populations.

According to a systematic review of eight meta-analyses, there is evidence that exercise may help decrease symptoms of depression in the general population, regardless of age. Both aerobic and resistance training appear to help reduce symptoms. For MDD treatment specifically, the most common exercise prescription for adults is 60 minutes of moderate-intensity activity three times per week over a period of 24 weeks. Some of the reasons this may be effective occur in the brain, in both the hippocampus and prefrontal cortex, where it can help benefit mental health. The 2018 Physical Activity Guidelines for Americans lists regular physical activity as having a positive effect on health, including brain health and conditions that affect cognition such as depression and anxiety.