

Alternative Medicine for Anxiety and Depression in Adolescents

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ABSTRACT

Natural antidepressants have been used since ancient times. Most modern medicines are derived from the same organic molecules as natural herbal medicines but tend to be highly concentrated versions of the organic molecules, making modern medicine unbalanced. This leads to many side effects compared to herbal medicines because herbal medicines look at the problem holistically. Herbal medicines have counteractive ingredients to assure proper dosage and effect. Stress, anxiety, and depression have been a part of society for as long as there has been a society. These experiences are often normal, albeit not always desirable. Currently, ayurvedic medicine, alternative medicine, and herbal remedies are making an entrance into the medical and pharmaceutical worlds with osteopathic medicines and practices. There is minimal research on alternative medical fields; therefore this research paper is meant to bring awareness and help ease symptoms of depression using alternative/ayurvedic medicine. This research paper supports the hypothesis that alternative medicine works better than man-made antidepressants in reversing damage to neurons and restoring mood and hormone levels.

Introduction

Medicine has been evolving for many centuries, now allowing scientists to create new drugs called antidepressants. This class of medications appeared in 1950 with the first drugs being iproniazid and imipramine. Antidepressants are used to treat many different types of depression, anxiety, obsessive-compulsive disorder (OCD), panic attacks, post-traumatic stress disorder (PTSD), etc. However, they tend to have moderate to severe side effects, including fatigue, dizziness, feeling anxious, insomnia, diarrhea, mood swings, vision problems, arrhythmia, and agitation. This means that a person's happiness may result in their body suffering. Not only that but many people who battle depression and anxiety tend not to go to a therapist or a psychiatrist because it is still seen as a weakness - this thought process is especially prevalent in adolescents. Adolescents go through a lot of stress in life, as many are in school and have to build a reliable life for themselves doing what they love. Some of these stressors can include grades, college applications, homework, tests, family drama, relationship drama, or friendship drama. Most of the time their mental illnesses can go unnoticed, making it easier for mental illnesses to ruin their world. This can be true for all age levels. The goal of this research paper is to provide information on herbal reliefs and alternative medicine that reduce symptoms and repair neurological pathways of a person battling a mental disorder such as anxiety and depression. All of these herbal medicines can be purchased over-the-counter effortlessly, making them an accessible alternative. The paper is divided into three parts: current man-made antidepressant drugs, natural alternative medicines, and alternative medicine for managing mild episodes of anxiety or stress. This paper is a resource for anyone who needs relief from mental health-related episodes using a safe method that will not cause withdrawal symptoms.

Antidepressants

The first antidepressant used in 1958s was called iproniazid. Iproniazid was the first of the monoamine-oxidase inhibitor series but was discontinued due to the discovery of liver damage in the patients(Britannica, 2018). The second antidepressant drug that came around the same time was imipramine. It is the first of the tricyclic antidepressant family(López-Muñoz and Alamo, 2009). These two drugs set the path for better psychological care and aid, with Fluoxetine making it even better in the 1980s which led the way to all the families of antidepressants today(López-Muñoz and Alamo, 2009). **Figure 1.**, below, shows the chemical composition of imipramine which has a chemical formula of $C_{19}H_{24}N_2$. **Figure 2.** shows one of the types of tablets that are given to patients by prescription. There have been some benefits of Imipramine tablets as antidepressants, some are mood restoration and may restore interest in survival. However, imipramine may have moderate to severe side effects such as fatigue, dizziness, feeling anxious, insomnia, diarrhea, mood swings, vision problems, arrhythmia, and agitation. Even though antidepressants improved the psychological care industry in the 1950s, they may be doing more harm than good. This calls for rethinking treatment using natural alternative medicine.

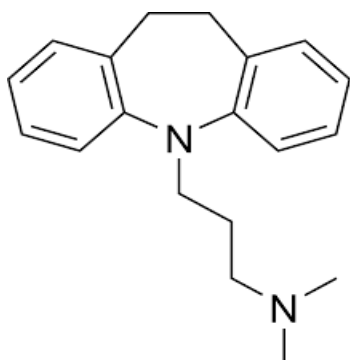


Figure 1. Imipramine



Figure 2. Imipramine tablets

Lavender

Lavender is a herbal flower with a scientific name: *Lavandula angustifolia*. Lavender and lavender-based products have been used as herbal medicine, dating all the way back to ancient Egypt. For example, it is used a lot in sunscreen, lotions, candles, and aromatherapy because of the scents associated with plants(Yeung et al., 2018). Especially Linalool and Linalyl acetate, as these organic molecules help control and restore mood and neurons(Malcolm and Tallian, 2018). The herbal remedy can be used as an essential oil, supplements, vitamins, teas, and as fresh herbs. “Essential oils delivered via inhalation route may exert psychological effects because the olfactory bulb has limbic inputs in the amygdala and hippocampus that are associated with emotion and memory” making it the best way to introduce lavender as alternative medicine(Malcolm and Tallian, 2018). It can be used in a diffuser or as oil for a massage. Researchers have found that the scent of one's dentist's office triggers memories of previous dental visits and leads to a feeling of dread. However, a study using LEO(Lavender Essential Oils) led researchers to believe that using the scent in dental offices could reduce feelings of anxiety(Malcolm and Tallian, 2018). LEOs containing higher concentrations of Linalool and Linalyl acetate were shown to “be associated with positive emotions and mood, which is a core tenet of hypothesized benefits in aromatherapy”(Malcolm and Tallian, 2018). In one study in 2019, 160 mg of Silexan was taken by 121 clinical trial participants and happened to produce a higher decline on the Hamilton Anxiety Scale than just taking the placebo(Yap et al., 2019). Silexan contains 36.8% of linalool and 34.2% of linalyl acetate which are the two molecules shown in **Figure 3.**(Yap et al., 2019). This method of ingesting 80-160 mg of Silexan is

recommended for adults and is still in clinical testing, however, LEOs can offer relief. Not only for anxiety and depression but also insomnia, headaches, chemotherapy side effects, acne burns, healing, and mood issues.

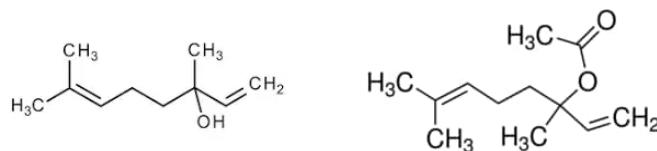


Figure 3. Linalool & Linalyl Acetate

Ginseng

Transitioning from a flower to a root of a plant from the *Panax* genus; Ginseng. This herbal remedy had been used in Chinese medicine for over 5,000 years, originally found in the mountains of Northern China. Ginseng can effectively regulate the immune response and hormonal changes due to stress, thus maintaining homeostasis, promoting regeneration, and building the immune system(Lee and Rhee, 2017). It possesses antiviral, anti-tumor, and analgesic effects due to its inhibition of cytokine synthesis(Lee and Rhee, 2017). “In addition to suppressing the occurrence of psychological diseases such as anxiety and depression, ginseng also prevents stress-associated physiological diseases” (Lee and Rhee, 2017). The effects of ginseng are apparent in various diseases and conditions. Recent findings have revealed that this root is involved in adjusting the hypothalamic–pituitary–adrenal axis - which is an interaction between the hypothalamus, pituitary gland, and adrenal glands - and controlling hormones, thus producing beneficial effects on the heart and brain(Lee and Rhee, 2017). Stress is a physiological response to various internal and external stimuli that have been found to maintain in vivo homeostasis upon exposure to environmental changes(Lee and Rhee, 2017). Ginseng contains an active ingredient called ginsenoside that can help aid the body during these stressful situations(shown in **Figure 4.**). Ginsenoside Rb1 is a flavonoid that acts as an inhibitor of the enzyme adenylate cyclase, affecting both cAMP and cGMP levels(Radad et al., 2011). cAMP inhibits neurotransmitter release, while cGMP is then responsible for reuptake(Radad et al., 2011). Ginsenoside Rb1 also modulates postsynaptic receptors by acting on the 5-HTP receptor and serotonin receptor(Radad et al., 2011). It also increases the number of inhibitory GABAA receptors in hippocampal cells which helps with memory formation. Physiological effects and psychological effects go hand in hand, and ginseng prevents both effects. Overall psychological stress can influence the concentration of blood sugar, cortisol and insulin; this effect may be explained by an inflammatory process initiated by brain substances that could stimulate insulin secretion(Radad et al., 2011). Ginseng has been shown to prevent these

changes by regulating the activity of components of stress pathways, making it one of the best natural antidepressants in the medical world.

SAMe

SAMe is the shortened name for *S-adenosyl-L-methionine*. SAMe is an amino acid (molecule shown in **Figure 5**) that naturally occurs in the body and was first created as a supplement in 1964. It has been shown to be effective at improving mood and relieving depression and anxiety in over 200 placebo-controlled studies. A research study on the effectiveness of SAMe compared the effects of SAMe to those of imipramine. Both treatments were shown to be equally effective in alleviating symptoms of depression (Bressa, 1994). A double-blind trial conducted by the New York team showed that SAMe was not only an effective medication in treating mild-moderate depression but also had fewer side effects. Although some studies have aimed to understand the role of lifestyle factors in depression, S-adenosyl-L-methionine concentrates on genetic and epigenetic factors that regulate neurotransmitter synthesis and metabolism. SAMe increases serotonin turnover and may increase dopamine levels and norepinephrine in the nervous system. There is minimal clinical data that proves SAMe may be helpful during recovery from major depression, however, one study shows the effectiveness of taking the SAMe drug. Clinical trial patients were given a dosage of around 45 mg i.m. daily, this appeared to have a rapid and beneficial effect mainly on depressed mood, suicidal tendencies, intellectual disability, and performance.

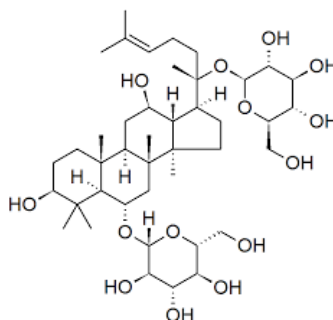


Figure 4. Ginsenosides

Improvement was observed in 80% of the cases in 4–6 days (Agnoli et al., 2002). The plasma levels of lipid peroxidation were significantly decreased within 2 weeks of the use of this new chemical entity (Agnoli et al., 2002). The results help support SAMe effectiveness in treating depression and anxiety and superiority over imipramine.

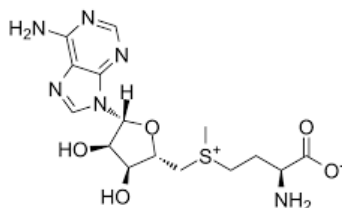


Figure 5. S-adenosyl-L-methionine

Ashwagandha

Ashwagandha, scientifically known as *Withania Somnifera*, is a rejuvenating herb that has been used in Ayurvedic medicine to enhance wellbeing and reduce stress. The root is commonly used as an adaptogen (an herb whose primary function is to modulate the body's response to stress) and is traditionally considered a rejuvenating agent. Ashwagandha is also known as Indian ginseng or winter cherry (Lopresti et al., 2019). This herb has been used in India for centuries and its uses and benefits have been recorded from time immemorial. Ashwagandha is a plant that contains an active ingredient (called withanolides shown in **Figure 6.**) with powerful effects on anxiety and stress (Singh et al., 2011). One animal study showed the active compounds extracted from ashwagandha root were as effective as lorazepam and another recent study found that Ashwagandha can have antidepressant effects similar to those shown by imipramine (Singh et al., 2011). This root could positively affect the entire body—from your nervous system to your blood pressure. One important effect is that ashwagandha appears to help lower levels of cortisol, a hormone produced by your adrenal glands in response to stress (Lopresti et al., 2019). Cortisol increases blood glucose levels when under stressful conditions, activating the fight or flight response and allowing the body to respond to the situation. However, when the level of cortisol rises, it can damage nerve cells and lead to depression and anxiety. **Figure 7.** shows 3 graphs portraying the effects of ashwagandha on cortisol, dehydroepiandrosterone -sulfate (DHEA-S), and testosterone (Lopresti et al., 2019). As seen in the graphs, compared to the placebo, ashwagandha significantly lowers the level of cortisol, while increasing testosterone in men over 60 days. This study provides strong evidence that ashwagandha lowers cortisol and depression.

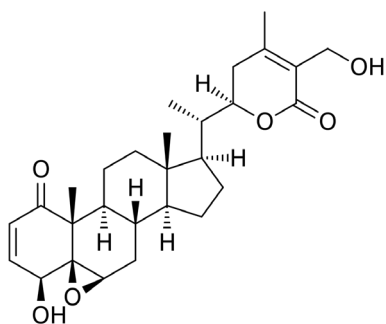


Figure 6 Withanolides

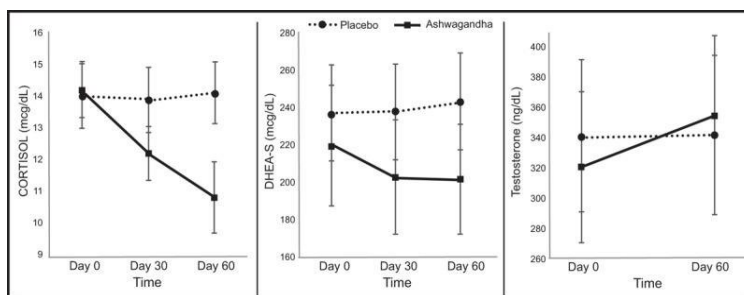


Figure 7. Adapted from Medicine (Baltimore): Mean change in hormones

5-HTP

5-hydroxytryptophan (5-HTP) is a naturally occurring compound found in the roots of *Griffonia simplicifolia*, which belongs to the family of plants called "coffee trees" (Maffei, 2020). The use of 5-HTP dates back to the first half of the 20th century when it was recognized as an essential precursor of the neurotransmitter serotonin and has a similar molecular structure shown in **Figure 8**. (Maffei, 2020). It increases serotonin at specific points in the brain and helps restore mood, anxiety, sleep quality, and others; as shown in **Figure 9**. But if one takes too much it can cause serotonin syndrome. Serotonin syndrome is a serious drug reaction. It is caused by medications that build up high levels of serotonin in the body (Maffei, 2020). The syndrome can be life-threatening if not treated right away. However, other than if you take too much, this has no side effects. 5-HTP is available as an over-the-counter supplement and is relatively safe for use. It was one of the first products marketed as an

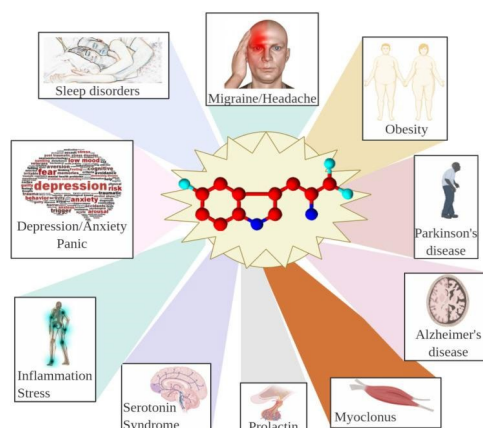


Figure 9. Adapted from Int J Mol Sci. 2021 Jan; 22(1): 181.

alternative medicine treatment for depression.

Alternative Medicine to Everyday Stress and Anxiety

St. John's wort (*Hypericum perforatum*), a plant that grows in the wild, has been used for centuries for mental health conditions. It's widely used as an antidepressant in Europe (NCCIH, 2017). However, most of the research on St. John's wort has been conducted in the short term, meaning that the trials did not take into account the full range of the drug's physiological and psychological effects. Research has shown that combining St. John's wort with certain antidepressants can lead to a potentially life-threatening increase in serotonin, which is a hormone involved in regulating mood and brain activity, causing serotonin syndrome (NCCIH, 2017).

Crocus sativus (*Iridaceae*), known as Saffron, is a perennial herb that is used in medicine and cuisines (Siddiqui et al., 2018). It is an inhabitant of different mountainous regions of Asia Minor, Greece, Western Asia, Egypt, and India (Siddiqui et al., 2018). Saffron was cultivated by the ancient Romans and Greeks. In medieval Europe, it became particularly popular because of its perceived health benefits. Saffron extract has been shown to act as an antidepressant. In particular, it helps reduce stress and anxiety, by balancing the levels of neurotransmitters such as dopamine, norepinephrine, and serotonin in the brain. Studies show that taking saffron supplements increases the blood flow to your brain and helps maintain a healthy mood (Siddiqui et al., 2018). The unique yellow-orange color of saffron is due to its high concentration of crocetin (shown in **Figure 10.**), a phenolic flavonoid with antidepressant properties that could be the active ingredient in saffron (Siddiqui et al., 2018). However, this molecule needs more in-depth study to test the theory and add some new insights.

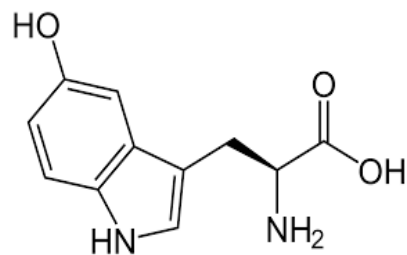


Figure 8. 5-Hydroxytryptophan

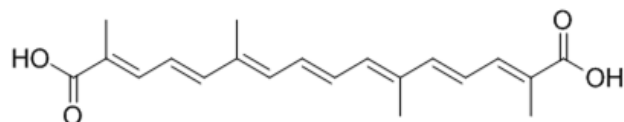


Figure 10. Crocetin

Chamomile, scientifically known as *Matricaria chamomilla* L, is a tea that has been used for centuries to reduce anxiety and stress. Chamomile contains key compounds called flavonoids that are known to have relaxing and sedating effects on the body (Mao et al., 2016). A 2016 study of chamomile given to patients with a generalized anxiety disorder (GAD) showed a reduction of moderate to severe GAD symptoms (Mao et al., 2016). Chamomile is not the best for depression but is great for anxiety, stress, and panic attacks. It helps to improve sleep quality for people with insomnia and can help with stress-related disorders such as fibromyalgia or chronic fatigue syndrome (Mao et al., 2016).

Conclusion

In conclusion, alternative medicines are shown to be equally as effective or even more effective than man-made antidepressants. Some of the best natural herbal medicines are lavender, ginseng, SAME, and ashwagandha.

The active organic molecules are balanced with other molecules in proper ratios to make sure that they will not cause serotonin syndrome. Unlike herbal medicines, man-made antidepressants cause serotonin syndrome in a singular dosage or if too much is taken. 5-HTP can cause serotonin syndrome if too much is taken, however, it is very effective and can be a remedy to both physiological and psychological problems. The analysis of available scientific data on the effects of lavender, ginseng, SAMe, ashwagandha, chamomile, saffron, and St. John's wort on depression and anxiety in humans found that they appear to be worthy of consideration for the treatment of these conditions. They seem to be a reasonable option for any adolescent who prefers a natural approach to treating their mental health illness safely with little to no side effects.

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