

Literature Review

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Efficacy of Dopamine Elevation Due to Deliberate Cold Exposure As Replacement for Medication for Major Depressive Disorder

I. Introduction

Major depressive disorder (MDD) is one of the most prevalent mental health disorders affecting people worldwide. Some symptoms of MDD are depressed mood, loss of energy, and diminished pleasure in all activities. Anhedonia, which is the inability to feel pleasure, is a common symptom of major depressive disorder and is closely linked to dopamine. One of the major contributors to the feelings of pleasure and motivation is the neurotransmitter dopamine. This literature review discusses 6 peer-reviewed journal articles related to MDD and dopamine. The focus is on the potential efficacy of utilizing deliberate cold exposure as a substitute for prescription medication to stimulate dopamine increases and therefore treat the symptoms of MDD such as anhedonia.

Both Belujon (2017) and Clenvenger (2017) agree that MDD is one of the most common of all psychiatric disorders. Both of their research papers looked at neurotransmitter activity in those struggling with MDD. The World Health Organization (2021) has estimated that 5% of adults worldwide suffer from depression, calling it the leading cause of disability. Major depressive disorder is a frequently occurring disorder, as is the use of prescription medication to treat it. According to the Center for Disease Control (CDC) (2020), in the United States over 13% of adults who suffer from MDD utilize prescription medication as a form

of treatment. That number may still be on the rise. There have been increases in the long-term use of medication which contributes to the overall increase in prescription medication as treatment for MDD. Another reason the amount of those relying on prescription medication will continue to increase is that the use of these antidepressants and other medications continues to increase with age in all populations.

II. Treatment Today

Popular prescription medications for MDD today are antidepressants which act through monoaminergic mechanisms. As Belujon (2017) explains in his research findings, these mechanisms alter the activity of many neurotransmitters, including dopamine. Another common medication for those struggling with MDD are serotonin reuptake inhibitors (SSRIs). These medications increase serotonin but decrease dopamine. They are the updated version of antidepressants and cause lower rates of side effects. Unfortunately, they are also less effective as treatment for MDD because of this. Finding the proper medication and dosage is extremely difficult to pinpoint on an individual basis due to the wide variety of options mixed with side effects and efficacy differences. Belujon (2017) found that $\frac{2}{3}$ of patients did not feel their medication was alleviating their symptoms after a course of treatment.

The efficacy of these treatments, many of which include antidepressants, specifically SSRIs, varies greatly from study to study. One study by Cartwright

(2016) found that 89% of participants reported that their depression was reduced after taking antidepressants. That finding may sound promising on its own, but the same study also found high levels of these participants suffering from significant adverse effects due to their prescription medication. These included; 73.5% reporting withdrawal effects, 71.8% reporting sexual difficulties, 65% reporting significant weight gain, and 64.5% reporting feeling emotionally numb to name just a few. In addition to these adverse effects, many of those who take prescribed medication to treat their MDD symptoms take years to find an antidepressant that works for them. Those who do take medication to treat their MDD symptoms may require these medications along with their side effects for long periods of time. The study done by Cartwright (2016) found that patients staying on medication for their symptoms for two years had a 60-63% recurrence of MDD rate. A different review mentioned in the same study which looked at patients being treated for MDD for over 10 years had very poor outcomes with large amounts of relapses. Finding proper and adequate treatment for MDD is a difficult undertaking. Both short-term and long-term medication treatment plans can end in relapse of symptoms as well as giving patients unwanted and sometimes extreme side effects. In conjunction with these difficulties is the medications' effect on neurotransmitter activity.

III. Neurotransmitters related to MDD

Previously, MDD has been more so associated with dysregulation of serotonin and norepinephrine, but recent studies have found that MDD and anhedonia are associated with lowered levels of dopamine (Belujon, 2017).

Some treatments look to raise these neurotransmitter levels with mild success and often accompanying side effects. Deliberate cold exposure has been found to raise dopamine levels by as much as 250% (Sramek, 2000). Deliberate cold exposure is the willing immersion of oneself into cold water.

IV. Conclusion

Many studies exist looking at the effects of immersing oneself into water. There have been very few studies looking at the effects of immersing yourself in cold water specifically (Sramek, 2000). Treatment for MDD utilizing the dopaminergic benefits of cold water immersion would save individuals from potential lifetimes of medication and provide an economical means to bettering oneself.

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